NATURE MAGAZINE

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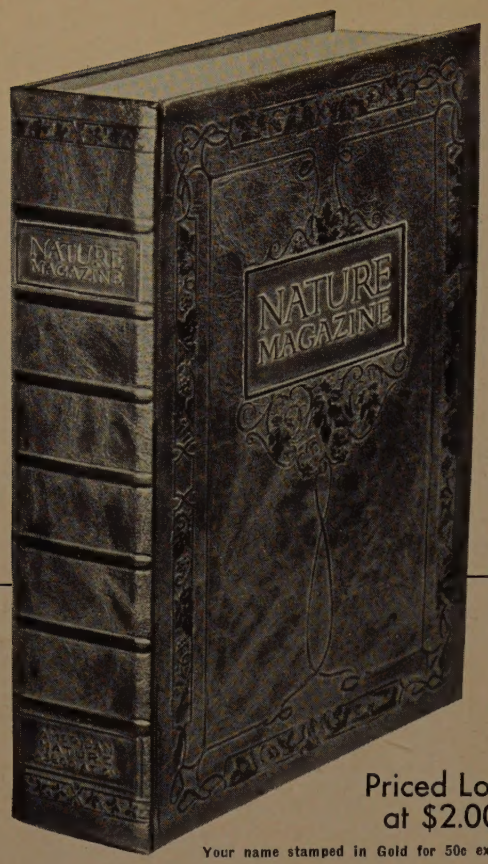

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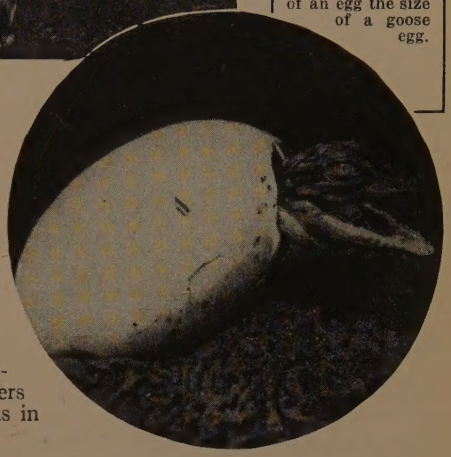
A Man-Eater takes a magnificent, flashlight portrait of himself by tripping over the photographer's carefully concealed wire.

This Crocodile may grow to be eighteen feet long, but it hatches out of an egg the size of a goose egg.



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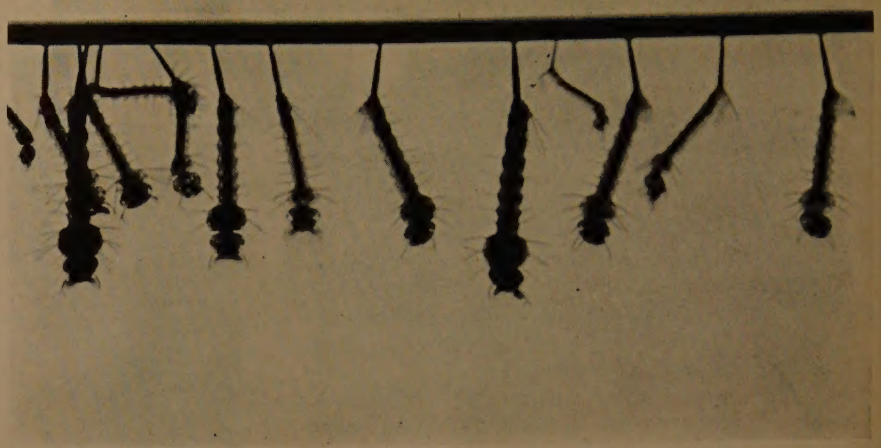
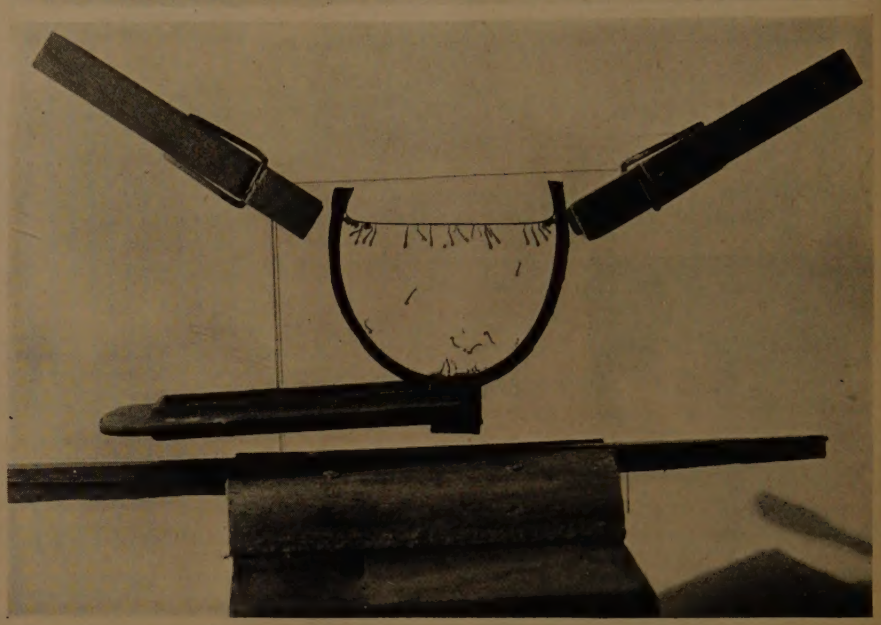
A HELPFUL HINT

BY HUGH SPENCER

Photographers, amateur and professional, are usually a quite resourceful lot when confronted with a particular problem. Such problems arise frequently in photography and there is a lot of satisfaction in solving them in a clever and effective manner.

The pictures at the right really tell the whole story here. The problem was that of photographing aquatic life. The device that is pictured is a simple solution. Here are two pieces of glass separated by a strip of rubber or rubber tubing and held firmly together by spring clips or small clamps. Into the resulting thin tank the water and its residents can be placed. If the water used is of the same temperature as the room in which the photography is to take place the formation of annoying small bubbles on the glass will be avoided. Try this out the next time you want to get a picture of eggs or larvæ of some water-living insect.





Don't Leave the Camera at Home

Any amateur photographer with an interest in Nature and the outdoors does most of his photographing in the field and under all sorts of difficult circumstances. He roams often afield because he is more often than not a lover of Nature first and a camera enthusiast by virtue of this interest.

Now and then he starts on a roam without the camera. It seems that every time this happens a picture is there to be taken and there is nothing to take it with. We shall never forget the party high on the side of a mountain in Glacier Park that had been hunting for a mountain goat for days, hoping for a good look at one, finally coming upon its goat. There the old fellow stood and not a camera in the crowd to bring back a record and prove it.

Donald Grant of White Plains, New York, who took the picture below, says that he will never travel afield without a camera. That is why, when he came upon this nest of a black duck, he came back with an interesting picture record for his Nature notebook.

Eastman's Special Movie Camera

The Ciné-Kodak Special, a 16-millimeter motion picture camera that will "do everything" and then a few tricks more, has been announced by the Eastman Kodak Company.

The Ciné-Kodak Special is introduced because of the Eastman Kodak Company's belief that ten years of amateur cinematography have prepared the way for a 16-millimeter camera of maximum versatility. The appeal of the new camera is to advanced amateur movie makers, to motion picture clubs, to engineers, to manufacturers, to doctors, to laboratory technicians—classes of cinematographers having use for 16-millimeter equipment with a professional camera's range of abilities.

Production arrangements provide that the Ciné-Kodak Special shall be precision-made by individual skilled labor. Fabrication of the camera is entirely on a custom-made basis, which allows for modifications when any special requirements present themselves. Although the camera is in itself the most complete 16-millimeter instrument ever built commercially, the Ciné-Kodak Special will serve in many cases as the basic model for the even more elaborate custom-built motion picture camera which cinematographers may desire.

The basic model incorporates provisions for double or multiple exposure, dissolves, slow motion, fades, masking, interchangeable film chambers, variable speed, and framing and focusing through the main lens system of the camera. It has a variable shutter, a two-lens turret, and provision for either spring motor drive, hand cranking, or the attachment of an electric motor drive. In addition to these features of the basic model, additional equipment or alterations will on special order be applied to the camera in process of manufacture.

With the advent of the Ciné-Kodak Special, viewers of amateur motion picture film may no longer be surprised to see one person appearing in several places at once on the screen, to see all the possible tricks of dissolving and fading and appearance from nowhere, to see Niagara Falls slowing down or speeding up at will instead of maintaining its accustomed rate of fall, to see a "long shot" dissolve into a close-up at a swing of the turret, to see all types of "animation," including the appearance of animated subjects in the sames scenes with living subjects, to see scenes interestingly masked, to see a man's legs walk out from under him, to see many slow motion effects, to see—as the Ciné-Kodak Special can record it—large views of very small subjects that were only an inch or two from the camera.

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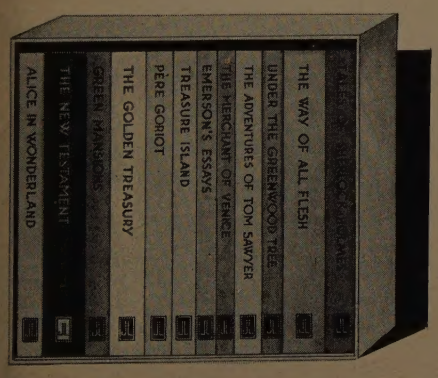

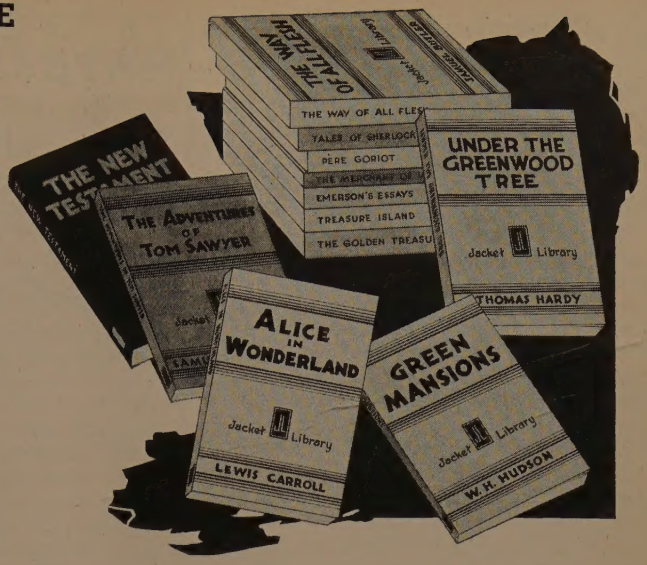

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"The controlling purpose of *Dynamic Biology* is to develop an appreciation of life and the interdependence of its various forms. In harmony with this purpose the text does not confine itself to detailed definitions and facts, but aims rather to give the student a perspective and to establish a scientific attitude toward the consideration of living things. These, in turn, provide the basis for scientific ways of thinking and scientific methods of attack." In this prefatory paragraph Arthur O. Baker and Lewis H. Mills indicate their plan in writing this biology text. They have carried their objective, as the wartime phrase goes, and the result is a most interesting volume. The illustrations are imaginative and stimulating and it should be a real pleasure to study biology with the aid of this volume. The publishers are Rand McNally and Company.

Bird Songs

It being the habit of some publishers to omit mention of the prices of the books they publish, we reviewed *Bird Songs and Songs of the Open* by Bert Dayton earlier this year and ventured the opinion that it sold for one dollar. A number of our readers have indicated an interest in this attractive book of outdoor verse and we now discover that the price is $1.50. We would say that it is worth it. The publishers are The Palisade Press, 125 Church Street, New York City.

NATURE IN PRINT

A Raccoon Story

In *Ringtail* Alice Crew Gall and Fleming H. Crew tell the story of a raccoon as fascinatingly as they did that of the tadpole and frog in their story called *Wagtail.* In fact, it is the story of a raccoon family that lives in a hollow tree—mother, father, sister and Ringtail himself having many adventures between Spring and snowfall. Ringtail's wanderings bring him into contact with many folk of the wild and the result is a charming Nature story. Dialogue is used, and although we do not care much for thoughts expressed in this fashion by dumb animals, the authors use excellent judgment and keep these thoughts well within the possible experiences of the actors in their story. James Reid has contributed charming and effective illustration and the Oxford University Press has printed the book beautifully. It sells for $1.50.

A Clever Book

"The Whachamacallit is a bird of the genus, Careless speech. It is a fledgling of Haste and Hurry. It was hatched from the egg of Hurry in the nest of speech known as 'What you may call it'. The Whachamacallit bird has been found in households and family circles. Very young children should be advised to avoid the company of the Whachamacallit when speaking. Never permit it to roost under your roof." This gives a clue to what *The Whachamacallit Bird Book* is all about. This much too common bird is a weird looking ornithological monstrosity as the author-artist, Frances Hamilton Archer, conceives him. He's the bird of careless speech. He is often found with The Dunno Bird, The Donwanna Bird, The Whooszziss Bird and others. These undesirable avians are pictured together with some of our lovely and desirable birds, and for each is provided a verse. The object, of course, is to show the youngster how bad careless speech may be, and this book does it nicely. It may be colored by the youngster, thus giving him—and little girls, too, if they are careless—a more intimate interest in the sugar-coated lessons. The little book is published by the Oakley Press, Paterson, New Jersey, and sells for fifty cents.

Sex in Plants

In *Sex in the Plant World* by Wilfred W. Robbins and Helen Monosmith Pearson we have a book which, so far as we know, enters an hitherto untouched field so far as popular science texts are concerned. The title is sufficiently descriptive of the contents of the volume. There have been many botany and biology books which have concerned themselves briefly with this material, but here the story of plant sexes is adequately and connectedly covered. The result is a distinct contribution to popular botanical literature. Both of the authors are on the staff of the College of Agriculture of the University of California. The book is published by D. Appleton as one in its New World of Science Series. It sells for two dollars.

Insects

All Nature students, particularly those on the West Coast, will welcome with enthusiasm the recently issued volume entitled *Insects,* the product of the combined efforts of several specialists of the Natural Science Department of the San Jose, California State Teachers College, a fact which assures the authenticity of the material. This volume of 320 pages and 139 illustrations is the first of a series planned to meet the needs of an ever-expanding program of study of science, particularly biology in that unique region. The authors with genuine sympathy and wide acquaintance with Nature out-of-doors strive to aid the reader to see beyond the merely superficial to the really important. The fascinating world of insects is presented in 20 chapters with many beautiful and original illustrations, dealing with such topics as orders, structure, growth, foods and food-getting, reproduction, air-getting, movement, protection, fitness, evolution and control. Consideration is given to such topics as study in social life, value, and where to look for insects. Full directions for collecting, preserving and rearing them also are given. An excellent annotated list of references to literature on the subject also is appended. Among those who have contributed to the work ($3.00) are Gayle Pickwell, Carl D. Duncan and Karl S. Hazeltine. Thoroughly dependable and charmingly written this book will have a wide appeal. J. S. W.

A Mississippi Text

Stories of Outdoor Science should find a warm welcome in the schools of the middle west. This new science textbook by Lewis M. Dougan, principal of the Eugene Field School in St. Louis, specializes geographically in a new manner. Its primary concern is with the region of the Mississippi Valley. The author points out in his introduction that science texts written with a background of New England or California are in many instances not appropriate to the region he has selected to cover. He also points out that this immediate text cannot be regarded as but the start of a series of similar books which would be needed to do full justice to the section. In his book, however, Mr. Dougan has done a most interesting and important piece of work and produced a volume that should be helpful in the upper elementary grades and junior high schools throughout a considerable tier of states. By the same token it is of interest elsewhere in geography as well as science study. The book is well illustrated by A. O. Leutheusser and ably printed by Lyons and Carnahan. The price is 80 cents.

Tropical Trees

Those whose winter plans include trips to the warmer sections of the United States this winter will find it helpful to have with them a copy of *Distinctive Tropical Trees* by Nellie Irene Stevenson. This handy little booklet describes sixty species of exotics found commonly in the South and the Southwest, and is helpful in answering the question that frequently arises: "Now I wonder what that tree is?" The book is available from the author in Fayette, Iowa, and sells for one dollar.

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By Paul Eipper

No other book will give you the same enduring impressive, objective picture of the inner emotions of animals. And, in addition, as Ernest Thompson Seton says: "the illustrations would be sufficient to justify the entire publication." Critics all acclaim it.

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Using the stark reality of his recurring enterprizes as a background the author paints a splendid picture of man's struggle to conquer the air and of the grand victory of human ingenuity in a brief span of twenty-five years after centuries of despairing effort.

LION

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Stranger than any fiction is this real story of life in the dark jungles of Africa. Filled with the haunting cries of wild beasts, the fragrance of tropical flowers, and the weird pictures of the jungle, "Lion" is far more thrilling than any mystery story.

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HUMANE EDUCATION

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THOUGHTS INSPIRED BY ATTENDING A NATIONAL HUMANE MEETING

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It is an inspiration to anyone to be privileged to associate even briefly with a company of men and women who have come together to exchange views and experiences and to discuss methods by which the suffering of man and other animals may be reduced. Young and middle-aged and old have come, some from distant points, with a common purpose. One cannot fail to be impressed with the earnestness with which they follow the discussions, and as their faces reflect their thoughts, betraying the sentiment that wells up within them at the recital of some particular instance of suffering that a little intelligent thought would obviate, or that a slight disregard for immediate monetary gain might blot from the dark record, the beauty that shines out on their faces seems to mark them as apart from the general run of humanity. The sympathetic observer cannot but wonder why all men and women do not seek a share of this leaven that may kindle within their own consciousness something of the enthusiasm that animates these workers for a great cause.

To the indifferent or the unthinking, or to that pitiable class whose minds are calloused to the pain that, at the best, all life must share, these humane workers may be visionary, impractical or narrow. To all such let us accord a share of the pity that we owe to all unfortunates.

Pain, disease, accidents—these are a part of the common lot of all life, human and non-human, the world over. But if man will but use a share of his boasted intelligence in lessening this suffering, especially that for which he is responsible, this world will be a better place, and we shall be a long step closer to enlightenment. Our treatment of the young and the aged and the needy of our own species still falls far short of the standard set by many tribes lower in the scale than the stage we claim.

In our methods of slaughtering the domestic animals we use for food we are far behind the goal that the equities demand. In the taking of our wild fur-bearers we are slow to avail ourselves of the improved methods already placed in our hands, while a reasonable curb on our vanity would reduce immeasurably the bulk of the misery that we deal out to our helpless brothers of the wild. In our taking of game species for sport we exact a toll of suffering so tremendous that could the half of it come to our realization as a people, we would needs bow our heads in shame.

But, one may ask, if such offences are so prevalent, why are they not corrected? Most people shrink from the sight of suffering, and refrain from inflicting it. We have long pondered this question and this is our conclusion. The cruelties most prevalent are inflicted by a small minority, in many cases in the service of the majority, but the cases themselves do not come directly under the observation of the mass of our people.

Not one in ten thousand who eat the chop or steak has seen the death of a single meat animal. What dainty wearer of Arctic fox has seen the trapped creature struggling in the blood-stained snow? What wearer of a muskrat coat gives thought to the millions of animals that suffer in the marshes of North America, from the Arctic Ocean to the Gulf of Mexico? In most cases the sensitive natures of the wearers of fur revolt at the mere suggestion that these creatures suffer, and they refuse to see even the pictures that prove it, claiming that they cannot bear such things. How many have seen the duck, wounded by the stray pellet of shot so that it cannot fly or find its food, drifting helplessly down the stream, or hiding on the reedy shore waiting for death? Yet millions of waterfowl thus end their lives each year. And what of the gentle mourning dove stricken as she seeks food for her young in the orchard, or the bobwhite that next spring would sound his clear whistle in the hayfield but now must flutter out his life in the thicket. Ask the hunter, for he is the only one who knows. And have we forgotten the Great War? Be sure that in thousands of homes the memory of it is all too fresh. So why should not our educators teach peace in the schools, rather than war?

Yes, we have need of the Humane Societies. They have done noble work in the actual lessening of the suffering that naturally, or unnaturally, comes to our wild brothers, to our domestic animals, and to our own kind. Let us strengthen their hand, for theirs is a service that humanity can ill spare.

THE WHISTLING SWAN

(See Page 270)

NATURE MAGAZINE

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FRIENDS INDEED

A STORY OF BIRD VISITORS TO THE SICK ROOM

BY

MARK F. EMERSON

IF YOU can not go to your friends it is an even greater pleasure to have them come to you and thus prove their friendship. When I was told I must take to bed for "a year or so" one of my greatest regrets was that I could no longer go to see my wild friends in their own haunts as I had so loved to do. I feared that my confinement must inevitably separate me from them. I have had the pleasure of discovering, however, that they can not only be persuaded to come to me but that I can become more intimate with some of them than I had ever believed possible.

ACROBATICS ON A "FLYING RING"

The chickadee might be observing, from his doughnut perch, that the fat and lazy goldfinch below was no such accomplished performer

We always had fed the birds about our home, but somehow I felt it would not be natural for them to come to an upstairs chamber window. Nevertheless I resolved to try to attract them there. The first step was to have a pole with a few heads of sunflower seeds and several bits of suet tied to it erected a few feet from one of my windows. Would the birds discover this food and dare come to it in such an unusual place? I hardly hoped they would.

Apparently they were keener and bolder than I realized. Within a few days I had the thrill of seeing the first chickadee light on the pole and help himself to a seed. Soon he was followed by all "his uncles and his cousins . . . and his aunts". Then the goldfinches appeared to get their share of the free food. Finally a few nuthatches and several downy and hairy woodpeckers decided they wanted to be in on it too.

But would they come to my window sill? That was where I really wanted to have them. I had a small, covered feeding shelf made and put out. It was filled with all the things birds like best; sunflower seeds, nutmeats, suet—even doughnuts. This second step was an immediate success. Within a few minutes the first chickadee came to the pole. He looked over at the shelf and without an instant of hesitation fluttered across to it. Those that came after him proved equally fearless. Soon I had a steady stream of my little friends coming to my window sill all day long.

Perhaps one should not play favorites but I could not help becoming particularly fond of the chickadees. Their cheery notes, heard the first thing after waking on those crisp winter mornings, always served to start the day happily. I loved to watch their brisk alert movements as they flitted about in the little pine tree that had been erected outside my window to provide a natural perch for them. They seemed as vibrant with energy as electric sparks. It was unbelievable that so much warmth of life could be preserved in such tiny bodies through sub-zero

nights and blinding blizzards. But nothing could break their indomitable good spirits. After the wildest storm or the frostiest night they would appear at my window as bright and happy as ever.

They would try several seeds in their bills until they found one large enough and heavy enough to suit them. Then in a flash they would be in the little tree pecking the seed out as they held it between their tiny feet against a twig. Sometimes one would peck his out against the edge of the shelf with such a resounding rat-tat-tat that strangers often wondered when they heard it how such a small bird could make such a racket. Chickadees are particularly fond of doughnuts and are excellent gymnasts, so I hung one of these bits of pastry from a wire to serve as a trapeze for them. What acrobatics they used to perform for me as they hung head down while they pecked at this edible flying ring.

In spite of their usual cheerfulness, sometimes these little fellows quarreled. Then their sharp notes seemed to indicate rather violent tempers as they dashed about after one another. But their anger seldom lasted long. Soon their harsh scoldings would be replaced by their sweet "phoebee" note which could be interpreted as nothing but a love call. When they had had their fill their "dee-dee-dee" would fade away into the distance as they flew from tree to tree off on their rounds again to be back in an hour or two for another snack.

THE FIRST STEP IN BRINGING THE BIRDS TO THE SICK ROOM

Note the chickadee on the sunflower head placed on a pole outside the window. Then the second step was a covered feeding shelf on the window sill of the room into which they later came

After my birds had been coming for some time I decided to try to take some pictures of them. I could set the camera up and focus it on the place where they were likely to come. Then I would get back into bed and simply wait until a bird came to the right place, whereupon I would pull a thread attached to the shutter. It sounded so easy. But there were so many things that had to be right. The light had to be good. The bird had to get in the narrow belt where the focus was sharp. Then he had to pose properly and remain quiet. I had to wait a long time before all these conditions occurred at the same time, and even then much film was wasted. But I had plenty of time, the waiting offered a welcome means of filling it, and occasionally the results were gratifying.

As the birds became more and more accustomed to the shelf and less and less fearful of people in the room I began to wonder if it might not be possible to lure them still closer to me. I had read of people getting birds to eat from their hand. If I could only do that! But since I was confined to bed most of the time it hardly seemed possible. Nevertheless I decided to try it.

Fresh air being my medicine my windows were open at all times, so it was only necessary to remove the screens—unnecessary at that season anyway—to allow the birds to come into the room. I had the screen taken away from the window where I had my shelf and moved the seeds to a little table just inside the room.

The first chickadee came. He hopped up and down the shelf complaining and scolding over the absence of his usual food. Then he noticed the dish of seeds inside the open window. "Dee-dee-dee-dee-dee, That's a funny place for those seeds. Whyever were they put in there?" He continued to hop up and down the shelf and among the branches of my little pine. He acted very much as though he wanted to come in, but lest anyone should suspect he did not dare to he tried to appear indifferent. He pecked half-heartedly at the suet in the tree, and wiped his bill on a twig a wholly unnecessary number of times, which only made it seem the more obvious that he was simply bluffing and stalling till he could get up his courage to come in for one of those seeds he so much wanted. All the time he kept glancing across at them, and several times he crouched as if he were about to fly over, but then his courage failed him. Finally he overcame his indecision and mustered up sufficient boldness to fly in. He lit on the edge of the dish and crouched there tensely as he peered anxiously about. At first he hardly dared lower his head to pick up a seed lest something happen while he was not watching. At last he

grabbed a seed in his tiny bill and dashed out the window with the sharpest note he could utter. In a few minutes he was back again for another, and this time it was much easier. Before long he was coming in without the least fear, and his brothers and sisters as well as the goldfinches and nuthatches soon followed him.

I left the table where it was for about a week until they all became accustomed to it. Then I began to move it back from the window very gradually. Every day I would pull it an inch or two further into the room. At first none of the birds seemed to notice the difference, but after I had got it two or three feet inside the nuthatches began to hesitate about coming in and finally lost their courage altogether. I was very hard-hearted, however, and resolved if they wanted anything to eat they must come in for it. If I put any seeds outside on the shelf for them none of the other birds would come any farther than that. I decided I would rather have a few birds inside than a lot of birds on the shelf, so I continued to move the seeds farther and farther into the room.

A BIG BREAKFAST FOR A LITTLE BIRD

Chickadees seem to like to have doughnuts for their morning meal as well as we do. Below is a study in bird silhouette on a winter morning; one of the goldfinches that came to the second story feeding station and later ventured into the room for food and to pose for his photograph although he did not realize it

Complications began to develop when the birds got in so far they forgot their way out. Very often one of them would try to leave by one of the front windows instead of by the one where he had entered. The birds apparently could not see the screens in these other windows and were much surprised and sometimes a little stunned when they bumped into them. Then they would fly about the room till they were able to find their way out. Often they would light on my bed in the process, and one morning a bewildered nuthatch actually tried to perch on the paper I was reading. Strange to say they seemed to get over their fear just as soon as they were safely out again, and many times one of them would come right back into the room again for another seed.

A most amusing incident took place one day when a particularly lively little chickadee saw the reflection of one of the windows in the mirror on my bureau and tried to fly out through it. I presume chickadees can hardly be expected to understand such conveniences of civilization, so it was not surprising that this one, when he saw the trees and the sky outside reflected so perfectly in the glass, mistook them for the real thing, and flew for them. As he approached the bureau he saw another chickadee flying directly toward him. He thought it was another bird, and a most impertinent one too, that would fly right at him thus. Such actions were the height of rudeness, and really quite unthinkable according to chickadee etiquette. He was an unusually snappy little chickadee himself, and certainly not the one to take this discourtesy lightly. He lit on the edge of a tray that was propped up just in front of the mirror, and, staring the other bird straight in the face, he proceeded to tell him just what he thought of him in the most emphatic terms. His image was almost beak to beak with him and scolded him right back in equally violent actions, even though he was inaudible. The chickadee got more and more angry. He poured out a flood of the strongest chickadee vituperation I ever expect to hear. I do not profess to understand bird language, but from the violence of that bird's remarks I am sure he was calling his reflection the very worst names of which he could think. I had hard work to keep from bursting into laughter and thus breaking up the ludicrous performance. The little fellow

"DEE-DEE-DEE. DO I DARE? DO I DARE? DO I DARE?"
This chickadee takes serious stock of his store of courage as he tries to make up his mind whether he should hop up on the hand holding the food he wants

continued his tirade for some time until it became apparent he could not outstare or outswear his imagined opponent. Then he hopped down on the bureau in disgust and flew out to cool off.

I continued moving the little table with the dish of seeds farther back into the room a few inches each day, until after about three weeks it was next to my bedside table. Then one day I became impatient and decided to risk a big move. I put the dish up on the larger table. Would the birds find it and still dare to come? The chickadees did, but it was at this point I began to lose the goldfinches. A few of them did come way in. One of them even took a nap with me one afternoon. He sat on the dish beside my bed for more than an hour, winking and blinking while I was supposed to be resting too. I was afraid he must be ill, but after some time he began to pick at the seeds and after a good meal flew out in apparently perfect health. The goldfinches came less and less regularly, however, till at last only the chickadees remained constant.

Gradually I moved the dish across the table nearer and nearer to my bed. Still they came. At last I was able to reach the dish from my bed. Finally one day when I heard a flock of chickadees approaching I decided to try the last step. I took a few seeds in my hand and placed it on the dish. The birds were at the window. I hardly dared breathe lest I should frighten them. One of them flew in and lit on the row of books on the table only about a foot from my hand. I think I was as tense and excited in that moment as a big game hunter about to bag his first lion. My heart was thumping so hard I feared that alone would frighten the bird. Nevertheless he

A SLEEPY GOLDFINCH SNOOZES ON THE DISH OF FOOD
One afternoon, drowsy from the buffeting of the winter winds, he took an hour's nap on the dish of seed at the bedside table while the author napped too

A BIRD IN THE HAND IS WORTH TWENTY IN THE BUSH

There is a thrill to such an experience that only he who has had it can understand. Note the thread from the author's right hand which pulled the camera shutter

hopped down on the dish, picked up a seed, and was gone. But I wanted them to come to my hand itself. Soon one did. He settled down into my hand with hardly a sign of fear. What a thrill I had feeling his tiny soft warm body against my fingers! I am sure the big game hunter would get no bigger one if he succeeded in killing his lion. In any case it convinced me that "a bird in the hand" was worth not "two" but twenty "in the bush."

As soon as the chickadees became accustomed to taking the seeds from my hand in the dish I removed the dish and simply held out a doughnut the center of which had been plugged with a piece of suet and then filled with sunflower seeds. They came to it readily, and by focusing my camera on the place where I held my hand and operating the shutter by a thread leading to my other hand I was able to take pictures of them in the act. Later I placed the dish of seeds on the bed beside me so that the birds were finally led to come to my bed itself for their meals.

Thus I was able to come into closer contact than I had ever believed possible before with these little flying creatures I had always loved and from whom I had feared my illness must separate me. Thanks to them the long days I had dreaded became filled with interest and pleasure. Their mute companionship, their dainty ways and their growing courage and confidence were rare and beautiful experiences. Anyone who loves birds and who has fed them in winter and housed them in summer will know what joy they brought to my bedside. When I could no longer go to them they had come to me to my great happiness and gratitude. They had proved "friends indeed."

A CHICKADEE WITH A TASTE FOR LITERATURE

If the truth were known, his taste was for some sunflower seeds in the dish beyond the book but he had to hop across the printed page to get at his breakfast

REMINDING ONE OF ANCIENT DAYS WHEN EARLY INDIANS FASHIONED JEWELRY

But this is a modern Navajo silversmith at work in his hogan. The rosettes on which he is working will be used to decorate the bridles of horses

MONTEZUMA'S JEWEL BOX

BY EDGAR C. McMECHEN

COULD we materialize such a poetic fancy as "magic casements, opening on the foam of perilous seas," I am sure that it would take form as a jeweler's window. Such casements hold an irresistible attraction for persons of either sex and, certainly, much hymeneal peril.

The cunning devices of the goldsmith in filigree and engraved metal are dangerous enough, but when the lapidary adds "full many a gem of purest ray serene" the situation becomes critical.

Now, this is not an experience enjoyed in modern times only. It was the same far, far back in the dawning when Stone Age lapidaries traded sparkling pebbles and many-colored stones for extra wives, and tribes went to war over rude quarries.

"But—" you may object, "those were crude baubles and gadgets that scarce may be classed as jewelry." To which I reply—"Yeah?"

Suppose we step to one of these magic casements looking upon the past and take a peek. Let us choose the great market place at Tenochtitlan in the days of Cortez, because there we will have an unrivalled opportunity to see the gem stones of a primitive people through writings of their contemporary white conquerors, as well as through the eyes of the modern archaeologist. As the radio announcer would say, "We now transfer you to Montezuma's jewel box."

As we stand before the booth of a particularly famous artisan a haughty chieftain of high rank, followed by attendants and slaves, jostles our elbows. His gorgeous mantle of feather mosaic—*plumaje*—gives him the appearance of a gay tropical bird. From a wooden helmet, colored with green malachite paint, project two curving horns, like eagles' beaks, each tipped with vermilion from Montezuma's mercury mines. Almost the entire surface is incrusted with a beautifully cut and fitted stone mosaic, set in pitch—turquoise, malachite, pearl shell and pink

A FUTURE NAVAJO BELLE

Note the shell earrings, the silver shell and turquoise beads, the silver buttons on her brown velveteen blouse and a can opener, to use, perhaps, for "gold-digging"

shell. Two entwined and crested rattlesnakes stand forth vividly in dark green malachite. The turquoise is not *teoxiuitl*—turquoise of the gods—that clear, brilliant blue secured from the far distant Cerillos Hills in our own New Mexico, for that is sacred and may be used only to decorate the gods, their ceremonial masks, sceptres and ornaments.

Attached to either ear of this warrior is a small disc of pottery, to which have been cemented mirrors of highly polished hematite. Emeralds, set in gold, gleam on either nostril, held in place by insertion of the button through holes pierced in the flesh. As he smiles at an acquaintance we catch a glimpse of crystal inlay on his incisor teeth. A gold breastplate is incrusted with a mosaic emblematic of his rank, four golden arrows projecting from either side, while from the lower rim dangle slender golden bells. To a necklace of turquoise is attached a mother-of-pearl pendant; and bracelets of gold, studded with amethysts, adorn his arms. Tiny hawks' bells of gold, depending from mosaic anklets, tinkle as he moves.

Thrust through his girdle is a knife, with chipped leaf-blade of honey-colored chalcedony. The handle is a crouching human figure carved in wood and incrusted with a mosaic of turquoise, malachite and shell of several colors—white, pink, purple and mother-of-pearl.

A slave carries his shield, a circular disc of wood, some thirteen inches in diameter, completely covered, save for a narrow rim from which flutter bright feathers, by an extraordinary mosaic, so smooth and highly polished that one may barely feel the joints with his finger nail. Massed bands and shadings of dark and light turquoise define the *tonatiuh*, or sun-dial design, 14,000 tiny circular or square fragments having been required for this shield alone.

Many warriors and merchants of high rank pass by, but there also are the poor whose cotton garments lack ornamentation. Even these, however, have managed to provide themselves with trinkets—necklaces of shell and coral, rudely made, breastplates and bracelets and rings of quartz crystals, chalcedony, alabaster, obsidian, jasper, amber.

The lapidary before whose booth we stand is an artisan of great merit and reputation. The chief by our side is particularly attracted by a small monkey head, not more than four inches high, and fit for Montezuma's own museum, in which every object within his vast domain is represented in the goldsmith's and the lapidary's art.

The head is carved of wood with the realism of a sculptor, and overlaid with a fine mosaic of turquoise, malachite and other stones. Each eye is set in the lower part of a protuberance covered with dark green malachite, startlingly offset by the blue turquoise face; and these eyes are brilliant convex discs of iron pyrites, surrounded by a ring of white shell.

A marvellous shield is here, crossed from top to bottom by bands of burnished gold, and, crossing these in turn, are bands of pearls. In the meshes thus formed are little toads of gold, cunningly carved. Animal and bird forms are plentiful. Here—a wooden bird's head like that of a jay, incrusted with the inevitable turquoise and malachite, but containing also bits of obsidian, pearl shell, red coral and white shell. There—a sinister, double-headed serpent of wood, fashioned for a breast ornament and covered with turquoise mosaic. Bits of polished white shell form the teeth in each widely-distended mouth, and pink shells tint the gums. Across each nose is a raised bank of turquoise and red shell, and the glittering eyes are polished fragments of iron pyrites that reflect the sunlight.

Now, if you doubt the accuracy of the magic casement I can only refer you to exhibits that may be viewed through plate glass in various museums of Europe and America: the turquoise shield in the Museum of the American Indian, Heye Foundation; the monkey head in the British Museum; the bird's head in the Museum of Gotha; the knife of chalcedony in the British Museum; the mosaic helmet in the British Museum, as well as the double-headed snake; the ear ornaments in the Museo Nacional, Mexico, and the American Museum of Natural History. And for divers other articles to the description of the Cortez plunder by contemporary writers.

There were other materials, of course, noticed in other booths: articles fashioned of silver, of marcasite (the white form of iron pyrites); articles beautifully gilded with gold leaf, blue stones like sapphires, and stones of whitish blue color (very likely aquamarine); bloodstones and hummingbird silex of many colors, selenite and steatite (soapstone); a fine grained coal, cut, polished and set with turquoise. Many of the rich, like our warrior, had inlays of turquoise, jadeite, hematite, obsidian, or rock-crystal in their teeth.

What is true of the Aztec jewelry is true, in the main, of Inca art, though the latter excelled in weaving. As in Mexico, gold and silver beads were common. Their gem stones included emeralds, amethysts, turquoise, agate, quartz crystals, lapis lazuli, malachite, azurite and smithsonite, or native carbonate of zinc. They also understood primitive smelting and, with bronze instruments, made with a tin alloy, they cut the gems, and polished them with native abrasives.

Archaeological research has shown prehistoric use of stones in mosaic by Arizona Indians. Shell and turquoise, catlinite (pipestone), malachite, azurite were embedded in gum on wood; coal ornaments were accurately cut and polished. The late J. Walter Fewkes found on Chavez Pass, Arizona, a magnificent mosaic laid over a shell of the *Pectunculus giganteus*. This was a turquoise mosaic set in pitch, with a rectangular inset of red jasper. Breastplates of coal and of selenite were found at prehistoric Sityatki. Dr. Fewkes reported the use of a quartz crystal to direct a ray of sunlight into a bowl in a Hopi ceremonial, and of the same stone for divining.

One of the most interesting uses of colored stones, with ancient precedent, but widely practiced today, is by modern Pueblo and Navajo Indians in the manufacture of sacred amulets or fetishes, representing the hunting gods. So precious are these droll stone animals that they may rightly be classed as Indian jewelry. Most valuable are natural concretions with animal forms. Fossil ammonites are sometimes prized. Most of the carved animals have natural colors appropriate to some one of the gods of the four cardinal points, to Those Above and Those Below. Some have been handed down for generations, have beautiful patinas and turquoise eyes, malachite or azurite (the sacred blue stone of the Zuñis).

Among modern Indians the Navajo silversmith is in a class by himself. He makes silver buttons, plain, fluted or engraved; silver conchos for belts, round, hollow beads some of which I have seen less than three-sixteenths of an inch in diameter; silver bridles and more sophisticated articles, such as cigarette cases, which the connoisseur in Navajo jewelry would not have. Mexican money is preferred for their work, and often the milling remains on the edge of a button. They work their silver either by casting or hammering, and are perfectly familiar with soldering, as were the Aztecs and Incas. The Navajos, before the introduction of borax by the whites, employed almogen, a hydrous sulphate of alumina, for this latter purpose. The bow-drill has long been familiar to the Indian and I have seen modern Pueblo beads, and picked turquoise beads from ant hills near prehistoric ruins in the Southwest, neither of which would permit the passage of a pin through the hole.

In the manufacture of jewelry and many sacred objects the Indian, modern and prehistoric, often employed mineral paints. Some of these pigments were produced from hematite (red), kaolin (white), pulverized malachite or azurite (green and blue), yellow ocher.

The use of shell was universal as it was easily obtained and worked, even with the most primitive instruments. Iroquois wampum is famous, though its manufacture and use were not confined to the Six Nations. The black beads, the most valuable, came from the violet part of the *Venus mercenaria*. The individual beads were cylindrical, about one-half inch long and one-eighth inch wide, and were strung on strings. These were woven together to form bracelets and belts, and the uses included ceremonial purposes, declarations of war, declaration of intentions of peace and for binding treaties, use as money and also in a mnemonic sense. One belt in the Collegio di Propaganda Fide, Rome, contains nearly 10,000 individual beads, while King Philip is said to have possessed a coat made entirely of wampum.

Haliotus probably was the most widely used and valued shell on account of its nacre. It furnished ornament and mosaic for the Aztecs and Incas, jewels for the amazing feather, or Sun baskets of certain California tribes, notably the Pomo; eyes and teeth for the frightful wooden masks of the Northwest Coast and Alaskan Indians. Other popular "jewelry" shells were the *Pectunculus, Conus, Cardium, Melongena, Oliva* and *Dentalium*, the latter used by California Indians for money. The Mound Builders and some California tribes utilized the columellae of large conches for pins, the latter frequently filling the spiral grooves with asphaltum to heighten the decorative effect. Pearls, of course, were highly prized. Captain Smith reported that Powhatan was "richly hung with manie Chaynes of great Pearles about his necke."

Certain famous Indian quarries were mined for centuries and were the cause of innumerable battles. The most noted were the Cerillos turquoise mines of New Mexico, upon which Montezuma is believed to have drawn for the finest blue stone, and the red pipestone quarry in Minnesota, first described by the artist, George Catlin, in the thirties. Science gave his name to this stone, and Longfellow gave the quarries to literature in Hiawatha. From these mines precious fragments passed through channels of barter through many tribes and across thousands of miles of wilderness.

As we have viewed these gems and stones—through our magic casement—so did the Indian view them. They were his magic casements through which he passed in becoming, for the moment, that very god whom he impersonated in his ceremonial dances, or those hunter gods through whose spirit, given him by animal fetishes, he triumphed in the chase.

Superstitions? Well—who is not superstitious today about birth stones, if he will be entirely honest?

THE SNAKE DANCE SHOWN IN A UNITED STATES NATIONAL MUSEUM GROUP

This group sets forth the culminating episode in the ceremonies by which, every two years, the Hopi Indians beseech the rain from the gods who control such things

THE WAYS OF THE WEATHER-MAKERS

BY CHARLES FITZHUGH TALMAN

WHEN you come to think about it, the artificial control of weather is far from being a mere dream of the future. It is already accomplished on a vast scale all over the world.

One of the most familiar methods of achieving this miracle is the wearing of clothes. Everybody except the pristine savage of the tropics carries an artificial climate around with him for the comfort of his body. The interior of the average American home in winter is a man-made torrid zone. Engineers regulate to a nicety the percentage of humidity of the air in buildings. Orchardists warm up acres of atmosphere out-of-doors with smudge-pots to circumvent Jack Frost. Whole cities breed weather of their own, unlike that of the surrounding country.

Man beats Nature at breeze-making. Zephyrs produced by electric fans are steadier and blasts delivered by certain types of testing apparatus in laboratories are stronger than any natural wind on earth.

Once in a while a mere mortal manufactures a thundershower by accident. This happens on a day when the air is calm and well charged with moisture. A lighted cigarette is deposited in a heap of dry forest litter. Soon the forest is ablaze. What follows illustrates several interesting operations described in books on meteorology. First there is the ascent of large masses of hot air. The supply of moisture originally present in the atmosphere is augmented by the processes of evaporation and combustion. The rising air cools by expansion and the moisture condenses. Drops form. They are shattered by the uprushing gusts and acquire electric charges. Strong potential gradients are set up. Presently the heavens are balancing their volt accounts. Meantime rain descends in a deluge. Finally the downpour puts the fire out and the storm ceases.

It is a plausible thesis that in days to come, through means now beyond our ken, man's weather-making achievements will greatly surpass those that are possible today. At the present time, however, his feats in this line fall so far short of his aspirations that the world is full of impracticable schemes for changing the normal course of atmospheric events. It is one of the thankless jobs of official meteorologists to throw cold water on these schemes.

The Weather Bureau is overburdened with correspondence on this subject. Letters concerning weather-making projects come from foreign governments, municipalities, chambers of commerce, newspapers and a variety of other sources, including the authors of the projects in question. It has happened more than once, when drought prevailed in some part of the country, that the Bureau has received frantic telegrams imploring information as to the best way to produce rain.

The schemes for controlling weather on which official science declines to set the seal of its approval fall into two distinct classes. The first includes those that defy the laws of Nature. Magic is still a popular substitute for

A ZULU MEDICINE MAN

His antics here indicate that he is busy warding off a hailstorm

futile than the other, and both are based on superstition.

The whistling and scratching were doubtless originally intended to imitate noises incident to windy weather. They were the primitive language in which the sailor of long ago sought to convey to the weather gods his desire for a breeze. In a waterspout the mariners of ancient and mediaeval times saw a living monster of the deep, which could be frightened away by a big noise. When one was sighted from a ship, the sailors shouted, beat gongs and drums or threatened the monster with their knives. Swords were waved in the air to make the sign of the cross, and the Gospel of St. John was recited. In other words, all methods employed to avert the danger were psychical rather than mechanical, and the firing of cannon at waterspouts, which dates back as far as the seventeenth century, originally embodied the same idea. Many other delusive practices in the field of weather-making that flourish at the present day among civilized people can be similarly traced back to customs and notions that prevailed in a more primitive state of society.

Twenty-five years or more ago a great deal was heard about the epidemic of "hail-shooting" that had broken out in Europe. The practice never took root in this country, but many sensational reports regarding the results said to have been achieved by it abroad were published in American magazines and newspapers. The custom of firing cannon at clouds to avert hailstorms began cen-

DELUSIVE PROTECTION FROM HAIL

Firing a cannon at the storm clouds in an Austrian grain field. A whirling ring of smoke is supposed, in some mysterious way, to prevent the hail from falling and destroying crops

A PAINTING BY JULES GUÉRIN. COURTESY EVERYBODY'S MAGAZINE

meteorology, just as it is for medicine, and it figures in a number of more or less plausible schemes that have but one serious defect—they won't work. The other class of projects to which official commendation is denied consists of those that are feasible, but far too costly to be practical.

The sailor who whistles or scratches the mast to raise a breeze is merely keeping up a quaint custom, in the efficacy of which he may or may not put some lingering faith, but which the world at large long since ceased to take seriously. When, however, a vessel master attempts to disperse a waterspout by firing a cannon at it, he is doing what many intelligent people regard as the normal thing to do under the circumstances. Yet one process is no more

turies ago in Styria and northern Italy. It was revived on a much more extensive scale about 1896. A special form of mortar invented for the purpose was introduced at that time in the vine-growing district of Windisch-Feistritz, now a part of Yugoslavia. The gun was mounted on a tripod and its muzzle was fitted with a long sheet-iron funnel. No projectile was used, but a whirling ring of gas and smoke was sent aloft by the discharge. The promoters of the process claimed that the mechanism of the storm was disturbed by the firing, so that hail would not form.

Plenty of testimony to the success of these cannon was forthcoming, and they were soon employed in great numbers throughout southern and central Europe, especially for the protection of vineyards. By the year 1900 fully 10,000 of them were in use in Italy alone. Some of these guns were forty feet high, and in the course of time they were supplemented by the use of bombs and rockets. Conferences of hail-shooters were held, at Graz, and elsewhere, in which the merits of these undertakings were discussed pro and con. Eventually the Italian government was induced to appoint a scientific commission to investigate the subject, headed by the well-known physicist, Senator Blaserna. The commission reported unfavorably, but in the meantime the craze had begun to wane, though it has never entirely died out. Its decline was probably hastened by the advent of a new and less expensive scheme—equally futile—for securing "protection" from hail, which consisted of setting up so-called "hail-rods," or "paragrêles," imitated from lightning-rods.

A vast amount of pseudo-scientific literature was published in behalf of hail-shooting. The effects ascribed to the firearms were said to be mechanical, electrical, chemical, hygroscopic and so on. No advocate of the process claimed that the effects were psychical, yet it is fairly cer-

"RAIN GOD" FROM MARQUESAS ISLANDS
When it was brought to Chicago's Field Museum the Windy City enjoyed a heavy downpour ending a long drought!

A KAFFIR WITCH DOCTOR
Here he is engaged in the business of making it rain. Nature willing, it does!

tain that the modern expedient of bombardment would never have been employed against hailstorms if the notion had not prevailed at an earlier period that storm clouds, or the malevolent beings supposed to inhabit them, could be terrified by hostile demonstrations on the part of mankind. Herodotus tells us how the Thracians, centuries before the Christian era, shot arrows at the gathering clouds to avert a storm. The same practice was common among the ancient Gauls. Through the Middle Ages the ringing of church bells was a favorite procedure for securing protection against both hail and lightning.

The belief that cannonading causes rain and may therefore be employed advantageously as a cure for drought is another example of a modern idea founded on ancient superstition. This belief is one of the most widespread of popular fallacies. During the wet summer of 1910 in England the farmers of the southern counties petitioned the Admiralty to postpone the target practice of the British fleet in the Solent until they had got in the crops, which were being ruined by rain. The rains in France and Belgium during the World War were popularly ascribed to gunfire, just as were those that made Virginia mud notorious in this country during the Civil War, though in both cases climatic statistics show that the rainfall was no heavier than in time of peace.

WEATHER-MAKING THAT WORKS

A few of the millions of orchard heaters that protect California citrus groves from frost

This notion is merely a modern adaptation of the ancient belief that rain is the usual sequel of battles. Plutarch mentions this belief and offers two explanations, which are, from a scientific standpoint, just about as plausible as those proposed nowadays to account for the alleged production of rain by modern artillery. He says:

"Extraordinary rains pretty generally fall after great battles; whether it be that some divine power thus washes and cleanses the polluted earth with showers from above, or that moist and heavy evaporation steaming forth from the blood and corruption thicken the air."

Because the ancients, who had neither firearms nor a knowledge of physics, fancied battles to be a cause of rain, a number of unprofitable attempts have been made in our own time to shoot water out of the sky. The most celebrated of these undertakings was the one carried out by General Robert Dyrenforth with the blessing of the United States Government. Congress appropriated $9,000 and the experiments were conducted first in the suburbs of Washington and afterward on a ranch in Texas in 1891. Balloons filled with a mixture of oxygen and hydrogen and sticks of dynamite carried up by kites were exploded in midair, and explosives were set off at the same time on the ground.

The experiments lasted for several weeks, and in some cases showers fell within a few hours after the explosions. The tone of the official report was somewhat favorable, but the consensus of scientific opinion regarding the results was decidedly adverse. Additional experiments conducted the following year met with no better success. The one tangible outcome of this affair was that a crop of commercial rainmakers sprang up all over the country, and to this day the example set by the official experimenters is cited in support of every harebrained scheme for juggling the weather. Inquiries about the Dyrenforth experiments still frequently come from remote quarters of the world to the Weather Bureau, though that Bureau had no hand in the undertaking.

The professional rain-wizard we have with us always. His happiest hunting grounds are the United States and Canada, but other countries are by no means exempt from his operations. The business methods of the typical operator in this field are ingenious. His offer invariably emphasizes the feature of "no rain, no pay," but he never agrees to forfeit any money in case the promised showers fail to materialize. By virtue of his one-sided contract he has everything to gain and nothing to lose, so that his bargain is about the safest gamble going.

The commercial rain-maker does not resort to the expensive process of bombarding the clouds. His methods are usually either chemical or electrical, or a combination of the two. A well-known practitioner of recent years places mysterious substances in open trays on a tower erected near a body of water. He modestly explains that he does not "make rain," but merely "works in harmony with the natural conditions that go to produce rain from a natural source." A generation ago one Frank Mel-

bourne, whose undertakings were backed by the railroads for publicity purposes, was wont to lock himself in a freight car, where he burned or evaporated certain chemicals. There is a generic similarity and perhaps an historical connection between this chemical hocus-pocus and the practices once common among the American Indians, who burned sweet-smelling herbs in their wigwams and smoked the medicine-pipe while calling on the Great Spirit to open the skies and let out the rain.

Attempts to utilize electricity in making rain and otherwise influencing the weather have assumed a variety of forms at the hands not only of the charlatan and the ignoramus, but also of the serious scientific experimenter. Electrical apparatus for dissipating fogs and clouds was devised many years ago by Sir Oliver Lodge, and subsequently the same principle was applied by F. G. Cottrell in his well-known method of precipitating flue dusts. Some of the methods proposed are undoubtedly feasible, but from our experience not economical.

A great many startling things might be done to the earth's atmosphere if humanity were willing to pay the price. We have already mentioned the possibility of producing a thunderstorm by burning up a forest. Back in the year 1845, before any thought was given to forest conservation, a prominent meteorologist, James P. Espy, actually advocated the burning of large areas of woodland in the western states at weekly intervals through the summer in order to regulate the winds and rainfall to the eastward.

The idea of generating rain by means of artificial vortices in the atmosphere, produced (regardless of expense) by powerful blowing machinery, is a project that crops up from time to time. One genius, observing the deposit of water on the outside of an ice pitcher, proposed to set up a barrier packed with ice in the path of moisture-bearing winds. A well-known physicist has recently figured up the expense of operating such a contrivance under average conditions in a western state where the yearly cost of water for irrigation is now about $2 per acre. He finds that the thing could be run at a cost of about *$20,000 per acre per year* to the farmers "benefited" by its installation. Hardly a good investment.

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SALTING THE TAIL OF AN OCTOPUS

BY LEWIS WAYNE WALKER

PHOTOGRAPH BY THE AUTHOR

THE old adage "Put salt on his tail" must —excuse the pun! —be taken with a grain of salt! That is, in all cases, but one. It truly works on an octopus. A few weeks ago I was four hundred miles down the coast of California, getting data on commercial lobstering. At the San Hipolito Camp the swarthy-skinned fishermen decided to give the Americano a treat, namely octopus for dinner.

During a minus tide we tramped from rock to rock. Under some there were holes the diameter of a baseball, and into these a handful of salt would be tossed. Immediately water would start squirting out, and then a moment later a twelve-inch tentacle would protrude. Slowly, inch by inch, arm by arm, loath to leave its shelter, the octopus would emerge. With a quick grab he would be lifted from the ground, and placed in a sack, but not before he let loose a half a cup of ink which stained our hands a dark brown. When this fluid is let loose in the water it acts as a smoke-screen, and permits them to escape in an underwater fog.

The preparing of these Lower California delicacies (?) was simple. An expert cut with a knife removed the bony beak. A large flat rock acted as a chopping block, or table, while a small round stone worked as a hammer and beat them to a pulp, bringing to light the pure white meat. After being dipped in egg, and crumbs, they were dropped in boiling fat until crisp and brown—and so I ate octopus! At the time I said to my host, *"Bueno!"* but back here in the States, I'd rather change my words of praise to "It's a novelty—nothing more"—eating an animal that we caught by salting its tail.

A VISIT WITH THE GREAT GRAY OWL

BY OLAUS J. MURIE

U. S. BUREAU OF BIOLOGICAL SURVEY

"HELLO! AND WHO ARE YOU?"
If the great gray owl didn't say that, which, it so happens, he didn't, there can be no denying that he looks as though that were his greeting

THE SUN has set in the north as I urge my canoe down Salcha Slough, following its tortuous windings through the Tanana Flats. Swamp land in all directions; mud banks on either side, fringed with willows, and farther back the slender spruces spired against the rosy sky. The sun has not been gone long, yet it is almost midnight, for this is mid-summer day in Alaska, that delightful season of the northland when night brings no darkness and one sees no stars in the pale dusk of midnight. No hills are here to furnish a commanding view, with the sweep of a far horizon. In order to glimpse the distant marsh I had found it necessary to climb a tree. But who will deny the charm of the lowly swamp; the thrill of the presence of wild life; tiny creatures in the tangled grass, flitting forms in the willows, water-loving birds in the shallow reedy ponds, betokened by a subdued splash or quack; and what may not be lurking in the gloom of those spruces? Moose tracks on a sand bar quicken my interest. A beaver leaps off the bank with a startling "Ker-ploonk!" directly in front of my canoe. As I glide down toward my camp, alone, in this peopled solitude bathed in the mellow glow of the northern sunset, a sleepy white-crowned sparrow lisps his simple melody. The long Arctic day of June is too short for him.

A FEARSOMELY AGGRESSIVE YOUNG OWL
In fact, he took on a much more belligerent attitude than his parents, who were not perturbed

Then, as I swing around a bend and my camp appears in view, there is a flutter in a spruce top and I examine intently the silhouette of that group of black spires. Yes, that surely is an owl. A closer investigation confirms my suspicion. It is the great gray owl, that master spirit of the north woods, keeping his secrets in these little-known forests of spruce. I remember, as a boy, going often to a certain bank building to gaze and wonder at a stuffed one on display. But here is one in his home—the spruce swamps of Alaska. I shall not disturb him tonight.

Next day is clear and I hurry through breakfast, then push across the slough with my canoe to hunt up the owl, which should have a nest nearby. I have my camera, that destroyer of delightful mystery, yet who can resist a camera? Even though it bring into the garish light of day a form which has been a thrilling, tantalizing shadow. Perhaps, after all, it is better to keep this mystic ghost of the northern spruce.

But I seek the bird and find both parents at home, perching in the spruces overhead, peering down at me with anxious looks. I am sure now that I shall find their secret—a little one. And presently, in a dark nook, I find him, a fluffy youngster perched on a dead stub. No brothers and sisters can be found, but in a dead tree is the nest, empty now.

The young owl will not stand for a near approach and flutters to the ground. It is well to keep an eye on his elders. Once, when looking into the nest of a great horned owl, I had been struck a heavy blow on the back of the neck by the irate parent, leaving six bleeding punctures in the skin. But there is no need for caution this time. One of the birds soon disappears. The other, which I suppose is the female, shows only mild annoyance at my presence. She repeats an anxious call, "a-wah," and sometimes chatters like a red squirrel. Occasionally she varies her calls by a low emphatic "hu-whoo!" and again, when I pass near, there is a low hoarse "whoo" in the nature of a warning

"TOUCH ME IF YOU DARE"
The youngster glares, offsetting his helplessness with a demeanor that is fierce and warlike

growl. But this is the extent of her demonstration. She is remarkably patient and quiet while I maneuver about in the neighborhood, photographing her offspring. Never once does she offer to attack me or threaten in any way.

Not so the young owl. He splutters and threatens and glowers at me when I come near. He lifts his wings and puffs out his plumage to frighten me, in true young-owl style. He flutters from a willow to the ground, hops through the grass, then into another willow, and so the chase goes on. I follow with the camera until I have my pictures.

Before leaving I climb to the nest just for a peep at the owlet's home. It is built of rather small dry twigs. A few fragments of owl pellets lie about, containing remains of mice and a few squirrel hairs, a deserted home now. Nothing seems more lifeless than an old empty nest. I try to visualize the building of this one in the early freshness of spring, the courtship, rearing of the family, and the hunting exploits of the parents. These are fascinating bits of natural history still to be observed.

Little is known about the home life of this bird. Much knowledge of his life is hidden away in Indian lore and interwoven in their superstition, but little has found its way into written records. *Scotiaptex nebulosa*, scientists call him. The Crees of southern Hudson Bay know him as "Muskeg ohomisiu," the owl of the swamps or muskegs, while the northern Crees call him in their language the "real" or Indian owl. The Kobuk Eskimo of Alaska call him "Nahtuk" and between these geographical extremes he is known by many names among the numerous native tribes.

REALLY ONLY MILDLY CURIOUS
The patient appearance of this owl is borne out by its disposition in contrast with the warlike great horned owl

POSING FOR A PERFECT PROFILE
Sometimes he cooperated nicely and stayed on his limb so that the camera could make a good record

The great gray owl comes down from the far north some winters and visits southern Canada and the northern states. Curiously enough a pair of these hardy northerners has been found, probably nesting, in the Yosemite region of California, but the general nesting range is confined principally to the great transcontinental coniferous forest stretching from Labrador to British Columbia and northward to the limit of trees.

This big ghostly bird appears to be the largest of the owls as he flaps along with slow heavy wing-beats. As a matter of fact, he is nearly all feathers and his body is probably not more than half the weight of the great

horned owl, since he weighs only two or three pounds, probably averaging a little under three pounds. But his warm feather coat serves him well in the extreme north because he sometimes lives a hundred miles or more north of the Arctic Circle. His tail is long and his wings broad. He is slightly more than two feet in length, about half of this being tail, and he has a wing spread of nearly five feet.

Small rodents undoubtedly constitute most of the bird's food. Among the items found on his bill of fare are mice, shrews, rabbits and even crow. Nests have been found occasionally, and we learn that from two to four white eggs are laid. The nesting time varies, apparently from April to June according to latitude. My experience would indicate that in Alaska it is early in this period.

THE HOME OF THE GREAT GRAY OWL
A nest 25 feet from the ground in a dead spruce does not seem to afford much shelter but it suited this family

My first experience with this bird was on Hudson Bay. In a trap set for snowy owls I had caught one of these ghost birds and kept him captive for a time in a workshop at the trading post, where I sketched him to my heart's content and wondered at his extreme fluffiness and his comical, mildly curious face.

Later I met him often on the trail in Alaska, a great shadow slipping out of a spruce, flapping along softly for a space, then gliding up to a dead treetop, where he folded his great wings and turned his round face inquiringly toward the dog team. It is the spirit of such as he, coming out of his seclusion for a brief space to tease our latent sense of kinship with Pan, which fills the wilderness with that mystic atmosphere so appealing to those who go into the outdoors with an eye to see and a heart to feel.

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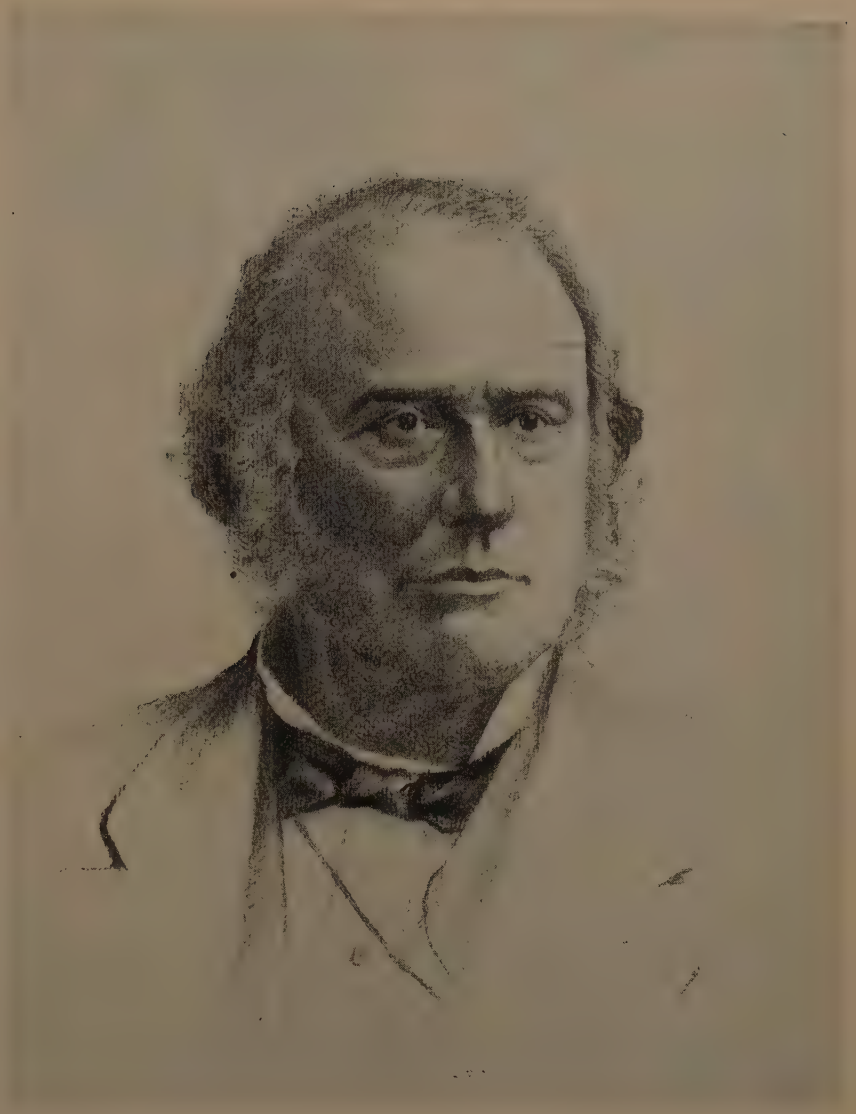
SNAKE PLAYS 'POSSUM

BY GRACE WHEAT

Did you ever see a snake play 'possum? That is just what a small black snake did for me. We came upon the snake curled up on the dead leaves apparently sleeping off a full meal. Its back and sides were glossy black while underneath was yellowish white. We did not wish to kill the snake if it was harmless and tried to pick it up between two sticks to carry out for identification. That snake had more tricks than you can imagine. It writhed, bit itself time and again until we thought it insane, rolled over on its back after several seconds, opened its mouth wide letting its black tongue hang loose. We hardly thought we had killed the snake but it looked that way, so we left as we had seen enough to give us a good description. Our attention turned to a peculiar tree and odd-shaped leaves. As we started away we gave a backward glance and were surprised to find the dead snake much alive. Back we went and began poking it with a stick. Almost immediately it played dead just as you see it in the photograph. While it lay so quiet the flies would crawl all over it. Three times it played 'possum. Twice we watched it revive in its slow-motion way. It would turn itself such a tiny bit at a time that only with the field glasses could we see it move until the tail would suddenly be right side up and slowly the rest of the body would right itself. Those beady eyes seemed dull at the time of "death" but must have observed every move that we humans made.

LOUIS AGASSIZ: INSPIRED SCIENTIST

By DONALD C. PEATTIE



"I WISH to be a good son, a good citizen, and the first naturalist of my time." So wrote Louis Agassiz when he was a young man and his father wished him to enter a business career, while he thirsted to explore the marvels of natural history. The boy was indeed a good son, but he did not always take his parents into his entire confidence, for while he was studying for a medical career (a compromise between science and business, arranged between his father and himself) he was working half the night through on his study of fishes.

At the age of ten Agassiz was already quite an accomplished little naturalist, with a creditable collection of birds and fishes, and a fair knowledge of the glaciers of his native Switzerland. He had committed to memory the Latin names of all the plants in his territory and he had already written several boyish but entirely serious articles on natural history.

By the time Agassiz had achieved entrance to Heidelberg he was quite an authority on fishes, and had become the friend of distinguished naturalists like Braun. He was a splendid sportsman and fencer and had built up a frame of iron while he cultivated his mind. Entering the new university at Munich in 1827 he enjoyed more and more contacts with great men. At this time he was so poor that he was ashamed to be seen in public on account of his clothes, and could not afford to buy text books. So he borrowed them and copied them out in long-hand, or committed whole chapters to word-for-word memory.

Still concealing his actions from his parents, he began the study of a marvelous collection of fishes which had just been brought from the Amazon by the naturalist Von Martius. When he drew up a magnificent report of them for the King of Bavaria and won fame all over Europe, his parents were so proud of him that they consented at last to his giving his life to natural science.

From then on young Agassiz's fame grew steadily, while his money fell lower and lower. He had only what would amount to fifteen dollars a month to live on, and just as he had decided he must give up his cherished ideal, a letter from the great naturalist, Baron von Humboldt, arrived containing two hundred dollars—a fortune to the poor boy. Moreover he soon secured a teaching position and at twenty-six he married Cecile, the young sister of his friend Braun.

One of the spectacular minor triumphs of science was now to befall the young man. He had, through his study of living fishes, become interested in fossil ones. We ordinarily think of the study of fossils as about the most useless and pedantic and uninteresting pursuit in the world. The time was coming, however, when Agassiz was to set the world of science on fire with the study of fossils, because he perceived that the history of the past could be read in the animal remains found in ancient rocks.

While on a visit to England he was giving a discourse before leading scientists, among them the geologist Lyell, when he was asked what sort of a fish might be expected in a certain layer of rocks representing a given geological period. Now Agassiz had never seen a fossil fish from rocks of that period, but so sound and so imaginative

was his view of the past history of the finny tribe that he was able almost instantly to reconstruct a theoretical type of fish skeleton that would have flourished in that period of geologic time. He drew his imaginary fish on a blackboard, and then someone arose and pulled a curtain aside from a fish fossil of that period. It was Agassiz's fish, and a cheer went up from the beholders. The astronomical prediction of the existence, the position, size and weight of the planet Neptune before anybody had seen it, was not a prettier bit of scientific reasoning.

The chance to visit America came soon after this, and once here Agassiz fell in love with our natural history, with the Americans, and everything he found. Here he resided for the rest of his days, travelling now to Lake Superior to study its fishes and its rocks; now to Florida to investigate its coral reefs; residing now in Charleston, S. C., and now in Cambridge as a professor at Harvard University. Having lost his first wife, Agassiz married again, an American woman of great literary attainments who gave to all Agassiz's later works their beautiful style which, combined with his own clarity of thinking, made Agassiz the most popular writer on science that we have had in America, that is, excepting men who were more literary than scientific.

Two very great scientific movements are connected with the name of Agassiz. The first of these was his theory of glaciation. Several Swiss geologists, but especially Agassiz, believed that northern Europe and northern North America had once been swept, in geologically recent times, by a mighty ice sheet. The great drift deposits left by the glaciers, the moraines and drumlins, the perched boulders and long scratches on the rocks, all were there in plain sight, and it does not seem very remarkable now that Agassiz should have discovered them. Hundreds of other scientists had seen them too, but never grasped their meaning, never asked how it was physically possible for a boulder weighing hundreds of tons to be perched on another rock. It took a daring imagination to suppose that in lands now temperate polar conditions had once prevailed and a glacier reposed its mighty weight. But Agassiz, who had some of the mental abilities of a poet, did conceive this very thing, and once he had proved its truth the only wonder, as Darwin said, was why everybody had not thought of it. One is reminded of the story of Columbus and the egg.

On the other hand Agassiz was a life-long opponent of Darwin and the notion of evolution. This was partly due to a scientific conviction, partly to his intensely religious nature. He himself was led to believe, from studying fossils, that changes in structure of animals had taken place, but he did not think of this as having actually brought about the evolution of a totally different group of animals from some older group, as, for instance, birds from reptiles. However, Agassiz taught his students to think for themselves, which was scientifically honest in him, and it is noticeable that all his students, and practically every one of them turned out subsequently to be great men, became converts to an idea of evolution.

It is safe to say that no American scientist ever had as much influence on scientific education as Agassiz; his influence put a stop to the folly of old-time school-boards that required one man to teach geology, botany, zoology, and chemistry.

By dint of his fiery zeal for science and his joyful and lovable personality he raised up around him a host of students who went forth and carried on his great work, doing honor to his name. By his ability to be human and not too coldly scientific he won too an immense popularity with the lay public.

It is not necessary to follow the falling star of Agassiz's health. One may satisfactorily see him last in the sunset of his life, covered with honors, still electric with enthusiasm for Nature. On his fiftieth birthday, May 28, 1857, men honored him with a great banquet. Bach's "Grand Choral" was sung and Longfellow read some pretty verses prepared for the occasion, which, however, in the lapse of seventy-five years do not stand the test of time so well as Whittier's lines on Agassiz. In Agassiz's old age his generosity (he gave his collections to found a museum for Harvard) was rewarded by the gift of the Island of Penikese off the coast of Massachusetts for a school and field laboratory of natural science. Here he gathered about him his most brilliant students and in the summer of 1873 opened, in a disused barn through which the swallows flew, his famous summer school which is now imitated in field laboratories all over the world. It is characteristic of the deeply religious feeling of the man that he opened that great school with silent prayer. Then the master and his school set out in their search for truth, a search that for them lasted all their lives.

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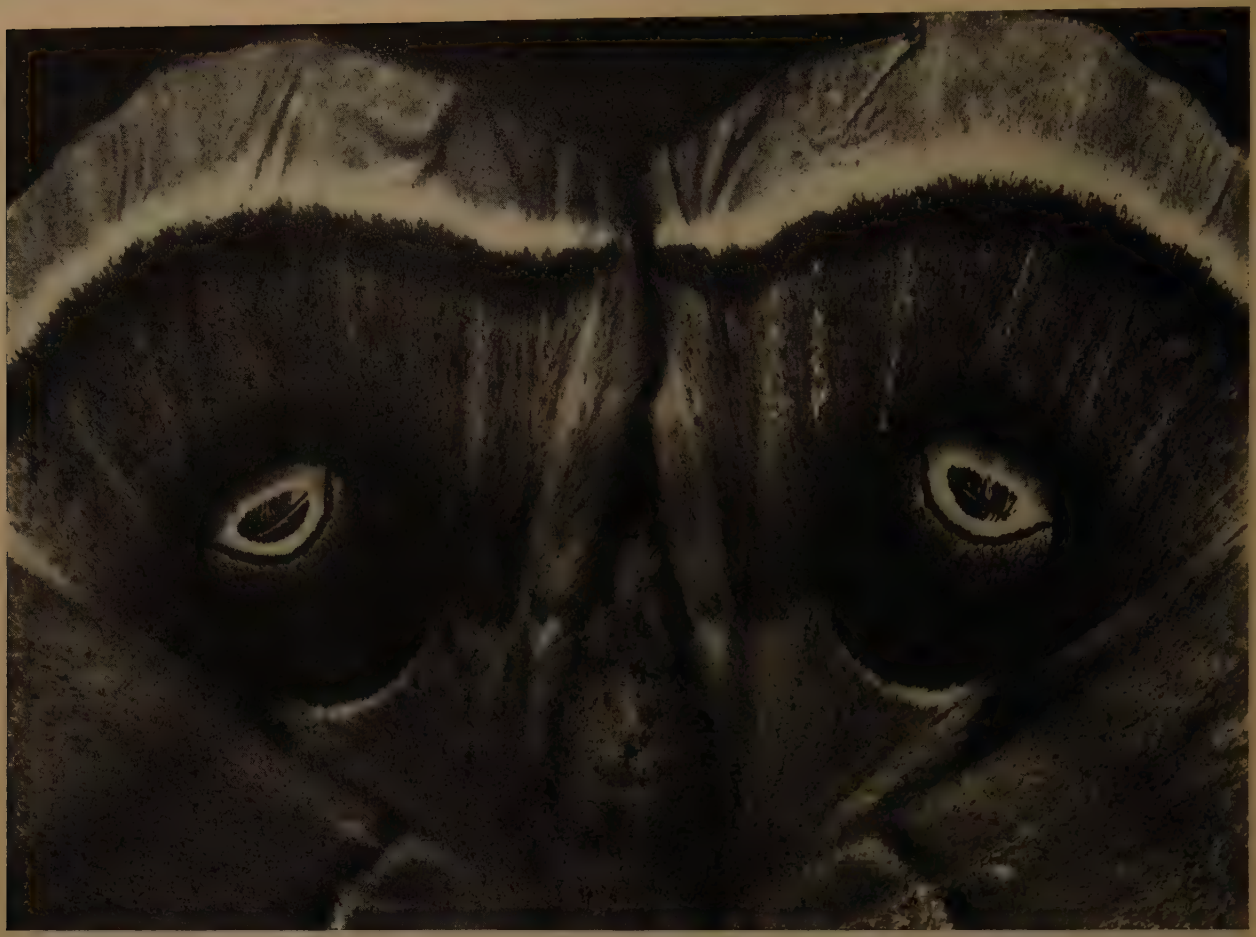
In the January issue of Nature Magazine we welcome back to our pages E. Chesley Allen, whose charming Nature stories have been absent for more than a year. Another coming feature is one by Leo Luttringer, who has gradually accumulated some amazing information on foster motherhood in Nature—dogs raising families of lion cubs and cats mothering orphaned red squirrels and other surprising facts. August Pohndorf, who was the author of our series on birthstones which ran in 1932, writes a story of the gem stones of the southern Rockies. An interesting story of the beetle that threatened the sugar crop of Hawaii and the quest for an enemy that would hold the beetle in check is told by David Livingston Crawford. These and other features make the January issue one which starts the new year right.

A MONSTER MOTH OF THE AMAZON RIVER REGION WHICH IS KNOWN AS THE FOREST TERROR AND WHOSE "EYES" CERTAINLY SEEM HYPNOTIC. LOOK AT THEM STEADILY FOR A MINUTE OR TWO

THE "EYES" OF MOTHS

PHOTOGRAPHS FROM RENÉ LEONHARDT

IN THE world of insects we find two general classes of formation, with, of course, much overlapping and various exceptions. Nevertheless it is possible to say, loosely, that insects are either protectively colored or formed so that they may mimic or blend with their surroundings, or that they are possessed of some form or physical attribute that makes them fearsome in the eyes of other insects or other enemies. The examples of in-



POLYPHEMUS HAS DARK CIRCLES UNDER ITS "EYES" AND AROUND THEM, FOR THAT MATTER. THERE SEEMS ALSO TO BE A SORT OF SLEEPY LOOK TO THEM

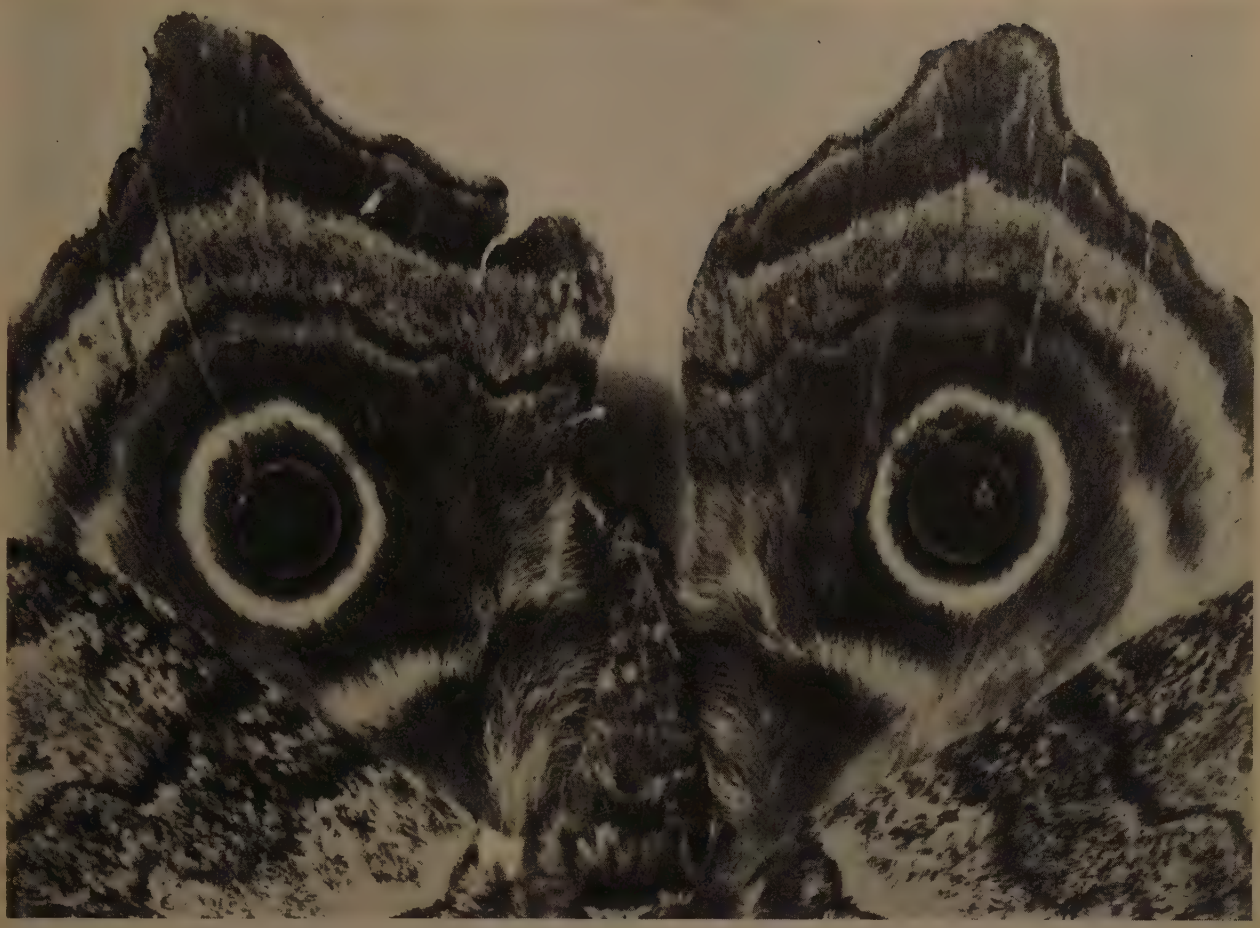
THERE IS A SERPENTINE LOOK TO THE "EYES" OF THIS NOCTURNAL PEACOCK MOTH, WHICH ALSO IS CALLED, NOT INAPPROPRIATELY, THE DEVIL'S EYE

sect mimicry are many and varied, as well as fascinating.

A German entomologist, Edward Penkala, has some interesting convictions about the meaning of insect forms and coloration. He cites the warning coloration of armed wasps, which warn enemies from attacking them; the warning color of harmless forms that imitate the armed species and thus deceive their enemies; the peculiar and brilliant colorings of butterflies, moths and beetles; and the distinctly protective coloration.

"Our silk moths," Mr. Penkala asserts, "are the best examples of deterrent effect in wing markings. It is an interesting family. Beginning with the silk-spinning moth we find extraordinary types with curiously-cut wings, fanciful coloration and giant form. The silk moths show characteristic eye markings of the wings, these often taking most fantastic shapes. Such markings are, of course, found in other species and genera of moths and butterflies.

"When the eye-marked moths and butterflies

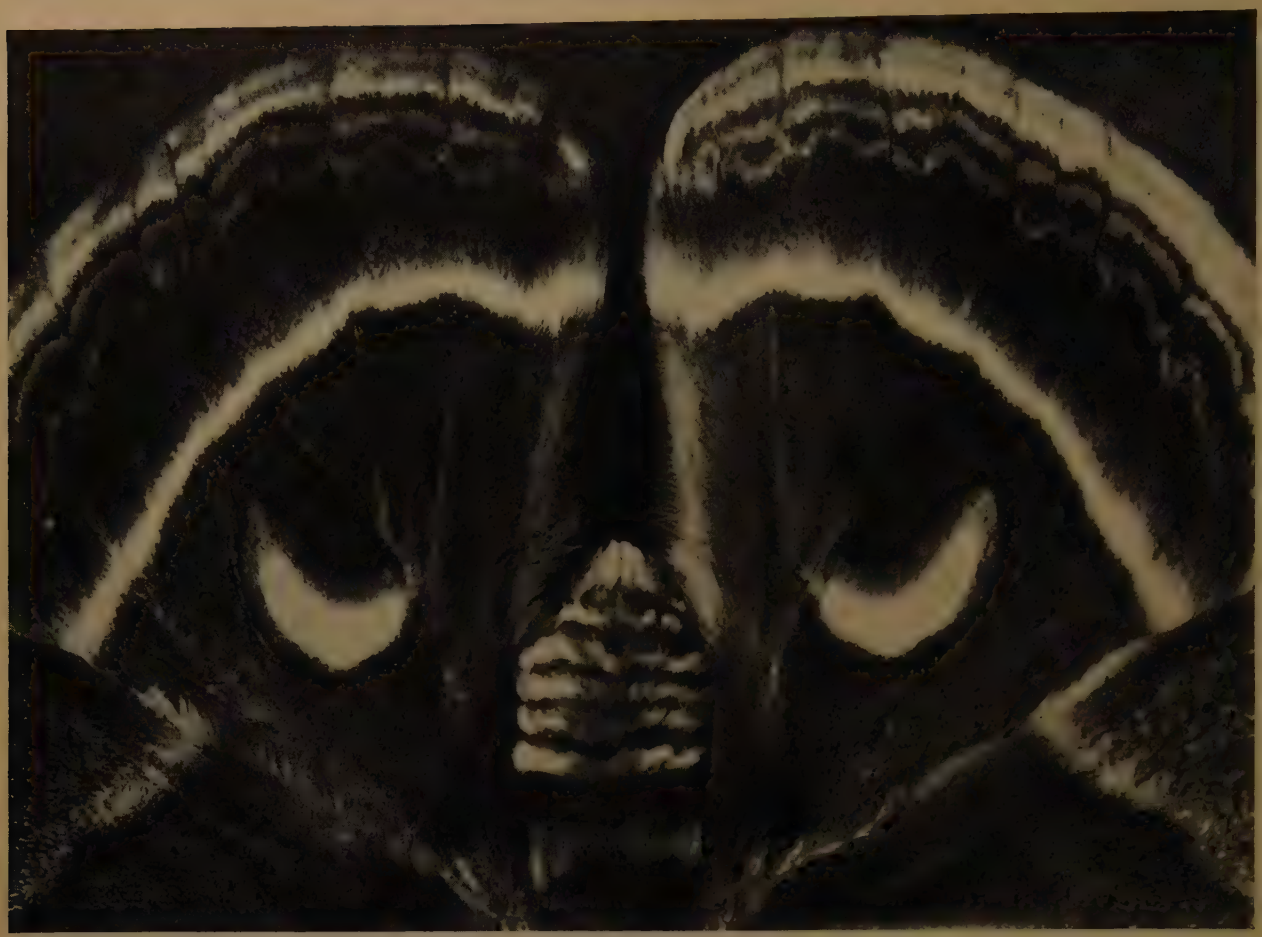


THE BLUISH RED DEMON "EYES" OF AN AFRICAN NOCTURNAL PEACOCK MOTH. IN THE MOTH THEY HAVE A NOTABLE BLOOD-STAINED COLORATION

A MOTH OF THE GERMAN OAK FORESTS KNOWN AS THE COBOLD OR THE NAIL SPOT. THERE IS A TRULY CRAFTY LOOK TO THE "EYES" THAT ADORN IT

are disturbed by enemies they move their wings. The hypnotic effect of those 'eyes' frighten the aggressive enemy, either making it uncertain whether to attack or utterly putting it to rout. Experiment has proved that these markings exercise an effect which, if not hypnotic in the precise definition of the word, is certainly awe-inspiring to the enemy. Everybody can experiment and prove for himself that the theory of deterrent coloration is just as true as that of protective mimicry.

"Among the well-authenticated observations was one of a hawk moth whose eye-like wing markings intimidated sparrows and finches to whom the moth was offered. They were obviously afraid of the insect although a larger bird finally devoured it. I have tried the experiment myself, placing the moth and some cracked corn on a chopping board in the poultry yard. Half a dozen sparrows sat close by, enviously looking at the corn but afraid to approach it on account of the insect. Finally a chicken ate the moth, much to the relief of the sparrows. Other experiments have confirmed these



AND HERE WE HAVE THE FAMILIAR "EYES" OF OUR OWN SAMIA CECROPIA, A LARGE AND LOVELY MOTH

two conclusions and even dead, eye-marked moths surrounded by attractive bird food have scared away the hungry songsters. In the wild the 'eyes' undoubtedly have an even greater deterrent effect."

Mr. Penkala's conclusions are interesting and offer the reader an opportunity to experiment himself and to prove or disprove them to his own satisfaction. Certainly as we look intently at the "eyes" of the insects pictured on these pages, we can imagine the doubt that might easily arise in the mind of a bird about to attack one such moth for a meal. In the color combinations—which are, inevitably, lost in black and white reproduction—the effect of the wing's "eyes" is even more startling and compelling and can be readily appreciated.

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A CAPITAL VISITOR

BY R. BRUCE HORSFALL

UNHERALDED and almost unrecognized, a noble visitor came to the Federal City last summer — a wild whistling swan. He arrived in the river across from Hains Point for the month of roses, and graced that immediate vicinity until after the Fourth of July. The visitor remained feeding on water chestnuts and other floating vegetation in close company with a small flock of scaup ducks and eight wounded canvasbacks.

The gait of "Muddy Ann," our little rowboat, was very slow, but twice we reached a point well within a hundred feet before he majestically flew away to his companions, the canvasbacks. His beautiful white plumage gleamed in the morning sun as, in answer to a call from us, back came a tremulous ringing reply, "Kru-u, Kru-u," as much as to say, "Good-bye, good-bye," for, upon our next trip, he had left the Nation's Capital.

WINTER CAMPING

BY FAY WELCH

DIRECTOR, TANAGER LODGE CAMP; SPECIAL LECTURER IN CAMPING TECHNIQUE, NEW YORK STATE COLLEGE OF FORESTRY, SYRACUSE, NEW YORK.

He who, in northern climes, fares forth into the open at this time of year must do so on skis or snowshoes and must be specially equipped if he is to camp in the woods. This, then, is one more in our series of camping articles. Major Welch is a man who is able to care for himself outdoors under all conditions, whatever the season or the weather. Here he gives some hints to those who think they have to stay indoors or at home in the winter.

TO CAMP only in summer is to become familiar with but one section of Nature's magnificent symphony. Then one hears only the muted strings. Spring adds the reedy wood-winds, autumn brings with increasing insistence the rhythm of the percussions, and winter climaxes with the stirring strains of trumpet, trombone and other brasses. Each is important, essential. Just as a gifted leader balances one section of his orchestra against another, by contrast enriching each, so the canny outdoorsman adds to his enjoyment of each season by his familiarity with the others.

The activities, hazards, penalties, and rewards of winter camping are quite different, and usually more severe, than those of other seasons. Interest in canoeing, sailing, swimming, and riding give way to concern over snowshoeing, skiing, skating and dog sledging. The selection and care of proper clothing assumes far greater importance than in summer. Gone are the hazards of forest fires, the annoyance of insect pests. Instead of capsizing in the rough seas of open lakes or the white water of rapids, one now must guard against breaking through bad ice. Transportation is more difficult. Roads, trails and waterways are closed.

Winter camping makes far more strenuous demands on the courage and stamina of the individual than does camping during milder seasons. It is not a recreation for one who would always be at ease. Rather it is for him who enjoys the stimulation of kindling fires on zero mornings, chopping ice from the water hole, cutting armful after armful of wood, struggling mile upon mile through deep snow, and then at the end of the day rest before a roaring fire and sleep under ample blankets.

To lose one's way in summer is seldom a serious matter. As Sir Walter Scott said long ago,

"A summer night, in greenwood spent,
Were but tomorrow's merriment."

PHOTOGRAPH BY FISHER, KETCHIKAN, ALASKA

WINTER CAMPING MAKES STRENUOUS DEMANDS ON COURAGE AND STAMINA

It is for him who enjoys struggling mile upon mile through deep snow and then at the end of the day to rest before a roaring fire and sleep under ample blankets

But to be lost in the wilderness in mid-winter is a decidedly dangerous experience. A high degree of skill in axemanship and firebuilding is essential if one would have a reasonably comfortable bivouac. Some individuals forget that a fire built on snow soon sinks out of sight unless supported on a substantial platform of green or wet logs. A better way is to clear away the snow, or if its depth renders this impractical, build the fire atop a rock, old stump or fallen log.

PHOTOGRAPH BY FAY WELCH

A FALLEN LOG AS A FIRE SUPPORT

With deep snow all around some such site is necessary for the luncheon fire

Earlier in this series detailed suggestions were given concerning finding one's way in the wilderness and as to what to do when lost (see NATURE MAGAZINE for July, page 28). Here we will only suggest, as an experiment for those who plan to spend much time in winter woods, that they go out a half hour's walk from the base camp some afternoon and with knife, hatchet and matches, see how comfortable a night's camp they can provide for themselves at this safe distance.

Whether skis or snowshoes make better equipment for the winter camper has provided, and will continue to provide, hours of robust argument for outdoorsmen. Personally, I prefer snowshoes for thick woods, for heavy packing, and when hauling or pushing sled or toboggan; but skis are my choice under all other conditions. Snowshoeing is good fun, but skiing is marvelously exhilarating, providing as it does variety of movement, speed, and a danger thrill that snowshoeing does not possess. Skis have helped me to cross safely many an Adirondack lake, and there are not a few good ski trails through those same mountains. From a long day of cross country travel through the semi-wooded country outside the mountains the man on skis returns the less fatigued, because he worked but little harder than his friend on snowshoes on the upgrades while every down slope provided him with a rest, not only in the running but

PHOTOGRAPH BY FISHER, KETCHIKAN, ALASKA

SKIS OR SNOWSHOES, WHICH? THIS WILL EVER BE SUBJECT TO DEBATE

Snowshoeing is good fun, but the author points out that skiing is exhilarating, providing a variety of movement, speed and the thrill of danger

also at the foot while waiting for his constantly plodding companion. Under other conditions the skis have even greater advantages, for example: last winter a friend on snowshoes and I on skis, starting from Paradise Valley, climbed for two and a half hours to a point on Mount Rainier some eight thousand feet above sea level. I made the return trip in twenty minutes (an expert skier could have cut that time almost in half), had a leisurely lunch and a nap before my friend reached camp! Of course an advantage of snowshoes is that one can become reasonably proficient in their use in a few days, while to manipulate skis skilfully requires months of practice.

PHOTOGRAPH BY DR. PAUL M. TRAUB

A STOP FOR LUNCH IN THE WOODS

A fire, a few balsam boughs for cushions and healthy appetites for the noonday lunch

Snowshoes of the "Bear Paw" type (oval, without tails) are to be preferred on very steep slopes or in exceedingly brushy woods. Under other conditions "tailed" snowshoes are more easily managed as the tail holds the rear end down, making tripping less likely. Sizes should vary according to the weight of the individual. My favorite size in the so-called "Algonquin" model (to support one hundred and sixty pounds) is 14 by 48 inches.

For general, all-around use skis made of good quality white ash are best. In length they should reach from the ground to a point 10 or 15 inches above one's head. By all means have the skis equipped with good toe or sole bindings that fit firmly on your ski shoes, and two good ski sticks. One might as well try to skate with skates tied on by heavy twine as ski with only the leather toe strap so frequently found on skis.

Whether snowshoeing in soleless moccasins or skiing in thick soled boots, footgear must be large enough to allow three pairs of heavy woolen socks to be worn comfortably. Beware of tight shoes. Frozen feet are the penalty for carelessness in this respect.

It is well said that mountain climbing in winter is largely a matter of knowing when to take off and put on clothes. During the climb one should try to remove

enough garments to avoid becoming wet with perspiration. These can be stowed in the pack sack which already contains lunch, maps, compass and first aid kit. Once on top all clothing will be needed as protection against the searching winds.

Three times the ice has suddenly dropped from under me when I was crossing Adirondack lakes. Yet never have I been near to drowning. (Freezing afterward was a more imminent hazard!) If one twists sidewise quickly, spreading his arms wide, he will seldom sink more than breast deep regardless of the depth of the water. Usually I carry a strong, light pole some eight feet long by two inches in diameter to try all snow-covered ice. If three or four smart blows will not drive this through the ice, then it is reasonably safe. The pole is also of assistance in clambering out if you fall in water.

PHOTOGRAPH BY FAY WELCH

TWELVE FEET OF SNOW AND STILL FALLING

The official snow measurer near Paradise Lodge in Mt. Rainier National Park

Lake ice is usually more hazardous near the shores. Beware of streams, or the lake surface near their inrunning, and remember to test the ice frequently. Once after traveling nearly a mile on solid ice, I stopped and sharply struck the butt of my pole on the snowy surface, only to have it almost disappear in the lake. Needless to say I backtracked, and detoured very carefully!

For those interested in Nature there are many interesting and beautiful things to be found in winter fields and woodlands. Whether it be the silhouettes of trees against the winter sky, the twinkling of winter stars on frosty nights, the patterns of weed stems and fruits above the snow, the nests of birds, or what Ernest Thompson Seton calls "the oldest handwriting of all", the tracks of the furred and feathered folk—all hold reward for the winter camper.

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THE SPIDER AND THE FLY

BY S. F. AARON

"Will you get out of my parlor?"
Said the spider to the fly.
"You look most awful savage
And I do not want to die."

So, in truth, we may paraphrase the old rhyme by reversing the order of intention and with very good reason, as anyone may easily discover who has at some length, or perhaps by chance, observed the antics of that bandit of the insect world, the well-known robber-fly. In such words might any one of the eight-legged, wandering Arachnid species of several families address the bloody-minded and fearless, two-winged sportsman whose sole inclinations seem to be the killing by direct attack of many valiant foemen often like-minded.

Bees, wasps, hornets fall victims to *Asilus* and *Erax;* grasshoppers, crickets, beetles, bugs, even the terrible assassin bugs at times are made to yield their life blood to satiate the appetites of these powerful Dipterons, armed with sword-like proboscides and great legs that hold the victims beyond the range of their offensive and defensive weapons, be they stings, bills or jaws.

When the robber-flies without hesitation attack and kill the powerful ground spiders that are in turn seeking victims, the aphorism turns a paradox.

THE HERB GARDEN COMES BACK

BY DOROTHY E. PLETCHER

A PAGE OF HERBS FROM AN OLD GARDEN BOOK BY PARKINSON PUBLISHED IN 1629

The plants are listed by the author as (1) Pot Marjerome, (2) Garden Thyme, (3) Savorie, (4) Hyssope, (5) Penniroyall, (6) Common Sage, (7) Sage of vertue

THE herb garden is with us again! Scientists, physicians and housewives are rediscovering the valuable properties of herbs, while gardening enthusiasts are being captivated anew by their beauty.

If you're contemplating an herb garden —and who isn't?—I know you'd enjoy a peep into some of the outstanding gardening books of sixteenth century England—an age when every gentleman was intrigued by herb gardening, and every lady supervised the making of perfumes and medicines. This, indeed, was the heyday of herb gardens. Great was the bustling of the housewives in the still-rooms where, from the herbs, they made ointments, teas, flavorings, medicines, sweet-bags to scent the linen, perfumes and pomanders.

Practically every old work on gardening enumerates the "vertues and physic helps" of each flower. *The Haven of Health* (1636) guaranteed cures by smelling herbs, sleeping on them, tying the leaves on the forehead, and inhaling the vapors of their boiling or roasting.

Have you ever glanced through John Gerard's famous *Herball, or Generall Historie of Plantes* (1597)? In London, Gerard, the most famous of all the English herbalists, had a garden containing one thousand different herbs. As Shakespeare was his neighbor, the great bard, whose works teem with references to herbs, undoubtedly gleaned some herb lore from him—the rest being supplied by Anne Hathaway's lovely garden.

And don't overlook John Parkinson's *Paradisi in Sole Paradisus Terrestris* (1629), wherein he penned much advice about herbs. In fact, the majority of sixteenth and seventeenth century gardening books devote considerable space to herbs.

Then there are the picturesque volumes of Thomas Hyll. His first work—the first gardening book printed in England—is titled thus quaintly: *A Most Briefe and pleasaunt treatyse, teachynge how to dress, sowe and set a Garden, and what propertyes also these few herbes heare spoken of, have to our comodytie. . . .* Later editions of this are known as *The Profitable Arte of Gardening.* His work, *The Gardeners Labyrinth* (1577), contains delightful pictures of Elizabethan gardens with people in costumes of that age. In these quaint old books one finds plans of knot gardens and mazes from which today we can reconstruct similar gardens.

Now, just where shall we grow our herbs? Shall we have an enclosed garden of geometric design like the knotted gardens that became the fashion in Queen Elizabeth's time? In these sixteenth century gardens the intersection of the paths and counterpaths divided the garden into four quarters, which were made into knots. Within the knots, formed by small herb hedges running through each other, were beds of old-fashioned flowers and sweet-smelling herbs.

A knot might be defined as a geometrical pattern or outline of some shape which is edged with a border plant. Although all the books of this age depict intricate designs for knots, the majority of gardeners preferred open beds or "open knots" to display their flowers. The

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TANSY, A FAVORITE IN THE HERB GARDEN

Of tansy, or "bitter buttons", Gerard, the famous herbalist, wrote: "In the spring time, are made with the leaves hereof newly sprung up, and with Eggs, cakes or Tansies, which be pleasant in Taste and goode for the Stomach"

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PLAN OF AN ELIZABETHAN GARDEN

A print from Thomas Hyll's book, the first garden book printed in England. Note the outer enclosure of wooden palings, the old well and the arbors opposite each other, and the second enclosure within which are the flower beds in geometrical design

design of the knot was designated as open or closed, according to whether it was merely outlined with a border plant, the inside being covered with colored sand, or was filled with flowers. Within the miniature hedges of herbs enclosing the various arrangements of flowers in distinct divisions, we can mass our flower colors separately; that is, have one bed of blue, another of yellow, and so on.

Let's enclose our entire garden—our Elizabethan herb garden of 1933—with a hedge of box. We'll substitute lavender cotton where box is not hardy. To form the knots we'll have lower hedges of hyssop and thyme. In the beds, within the knots, there'll be mints, chamomile, dill, borage, anise, sweet marjoram, tansy, sage, and any others that please our fancy. It would be charming to introduce many old-fashioned flowers here, too.

However, should we not have sufficient garden space to allow for a knot garden, why not plant our herbs in a double border on either side of a path? *Thymus vulgaris* and the savories and the low basils make excellent edgings. And behind them we can have coriander and anise, and behind them, the tall dill and the fennels with clumps of hyssop here and there.

Have you a spot in the garden where the grass just refuses to grow? Or some arid slopes or rocky soil? You need a ground cover? This is where the thyme and mints and chamomile and winter savory come in handy.

Herbs, you know, may be divided into three groups: aromatic, culinary and medicinal. Among the aromatics are lavender, rosemary and thyme. Sage, thyme, the savories, dill, fennel and sweet marjoram are still used by some people to flavor cooking. Among the medicinal plants rue, chamomile and valerian are well known. Medicinal plants were called "simples" because each was thought to be a simple substance forming a single remedy.

Within the dense gray-green hedges of lavender cotton are our hedges of hyssop. This herb, which is said in Sicily to keep off the evil eye, makes a pretty picture with its flowering spikes of pink, white or blue, and blooms from June into September. It grows about one and a half feet high, often taller.

Thyme, in olden days spelled thime and time, was one of the herbs through whose magic power one was supposed to see fairies! *Thymus vulgaris,* which grows about six inches high, puts out rosy lavender flowers in May. *T. serpyllum,* boasting purple-red flowers, grows about ten inches high, and is excellent both for our

knot hedge and for naturalizing. Thyme grows well from seed. Sow it early in the spring in drills three feet apart.

Of course, within the knots, we must have mint —"a good Posie for Students to oft smell." From July to September appear the small purplish blossoms of *Mentha piperita,* the true peppermint. The oil, collected from the leaves and flowering tops, is used for medicine, toothpaste flavorings and the like.

The aromatic wintergreen flaunts two particularly interesting varieties: *Aphylla,* a pretty little evergreen with shining red or green leaves, one foot high, bearing many small white flowers; and *Gaultheria procumbeus,* whose flowers are with us from June to September. They are followed by bright red berries which remain until the next season.

Then there's chamomile, an old favorite, as suitable for grouping on the margins of borders as it is for an edging. Europeans have raised it for centuries, using it to cover garden seats of raised earth. Golden marguerite, with its large golden yellow flowers growing three feet tall, blooms all summer. It succeeds in the poorest soil, and is excellent for cutting.

Dill, together with fennel and caraway, were known as "meetin' seed", because years ago, when the lengthy slumber-producing sermons got the better of the congregation, these seeds were nibbled in the belief that they would dispel drowsiness. And, as Parkinson says, "It is also put among pickled cucumber where it doth very well agree, giving to the cold fruit a pretty spicie taste or relish." Being an annual, dill is sown every spring. Coriander and dill, it seems, love to grow near each other, and, flowering about the same time, look well together.

Would you be merry? Then try a bit of borage, for according to *The Treasurie of Hidden Secrets and Commodious Conceits* (1586), "The vertue of the conserve of borage is especially good against melancholie; it maketh one merie." However, only a look at the pretty blue-flowered borage will quickly banish any gloom. Introduced into Europe by the Crusaders, it is one of the plants that the famous chronicler, Peter Martyr, mentioned as being planted on Isabella Island by Columbus' men. As borage is such a handsome cut flower, many gardeners sow it at intervals during the summer to obtain a succession of bloom—a most helpful flower.

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THE BLOOM OF THE PEPPERMINT
According to the herbalists of old, this plant was "a good Posie for Students to oft smell"

AN APOTHECARY'S GARDEN, 1547 VERSION
In the lower right, notice the men distilling medicines and drugs from herbs, while to their left is, perhaps, a consultation of learned medical men. Upper right, a patient is treated

Pliny gravely assures us that if anise is suspended to the pillow, to be smelt by the sleeper, it will give him a youthful look and prevent bad dreams. It does have more practical uses, however, for the oil from the seeds is used as a flavor in pastry, while the greens are used as a spice. In May sow the seeds in a warm, dry soil.

Those who are "given to over-much sighing" are advised by Gerard to try sweet marjoram. Parkinson wrote that it was "not onely much used to please the outward senses in nosegayes and in the windowes of houses, as also in sweete pouders, sweete bags, and sweete washing waters." Start this sweetly-scented herb with the tiny cream-colored flowers indoors in a cold frame, and transplant the seedlings to the garden when there is no danger of frost.

Would you be well in summer? Then drink tansy in the spring, said the old garden writers. Tansy, a strong-scented herb, with its "bitter buttons" of gold and its leaves "infinitely jagged and nicked and curled", was used as a flavoring, a cosmetic and a medicine. As its yellow flowers long retain their color, they were usually included in New England "winter posies."

Tansy was one of the earliest plants brought over by the Colonists. Its yellow, buttonlike flowers, on erect stems one and a half to three feet high, are produced in terminal clusters from July to September. Although it may be propagated by seed, it is more readily raised by division of the roots early in spring. Set the divisions eighteen inches apart.

In late June appear the lavender-blue flowers of sage. Dried sage leaves have long been used as a flavoring for the stuffing of ducks and geese, and as a healthful tea to cure colds. It is said that it prospers only where the wife rules! Many a superstitious soul planted it with rue to keep toads away! Being a hardy perennial, it flourishes for several years when once established. It is usually grown from cuttings.

Unique indeed is the little broad-leafed gum plant. This erect herb, about one and a half feet in height, has numerous branches, each one ending with a yellow flower about three-quarters of an inch in diameter.

True lavender has sweet-scented lavender flowers which housewives have long been wont to dry and place among the linens to perfume them. In England, famed for its lavender perfumes, the oil, distilled from the young tops and flowering spikes, and blended with other ingredients, is made into perfume.

The two best varieties of *Lavandula* for this country are *L. vera* and *L. nana.* The former is a splendid new dwarf English introduction which is good for edging and planting between roses. *L. vera* is the true sweet lavender which grows eighteen inches high, and displays fragrant blue flowers in July and August. Both varieties are particularly suitable as edgings to paths, and are often used in this way. Lavender, not being easily grown from seed, is propagated from cuttings or by division. In early spring, set the rooted cuttings in well-prepared soil—about two feet apart each way—when growing it in beds.

Summer savory, an annual, and winter savory, a perennial, have long been in the herb garden. The former, with its pale pinkish-lavender flowers, and the latter, with pink-tinged white flowers, both growing about one foot high, indeed make dressy edgings for the garden path. In olden times many a cold was treated with a dose of savory tea.

Native to India, basil is sacred there above all other herbs, and the house which is surrounded by basil is thought to be blessed. Sweet basil, a small bushy affair about two feet high, with its greenish-white flowers which come in July and August, makes an attractive edging. It won't be necessary to use the method of the ancient Greeks who thought that basil wouldn't grow unless it was sown with words of abuse.

Back in the Twenty-first Dynasty, coriander must have been thriving, for its seeds have been found in Egyptian tombs of that age. The Chinese, who believe that the seeds confer immortality, have been growing it since the fifth century. The dainty little coriander plants appear in July, and later present the gardener with a second self-sown array in September. Sow them thinly, keeping them thinned out to about five inches apart in the rows.

Behind the path's edging peer the yellowish-green flowers of the common wild fennel. In early spring, sow the seeds in the open in drills about three feet apart and cover them lightly. Thin the plants out so that they will be about fifteen inches apart in the row. Sweet fennel, the common garden fennel, is likewise popular. Its leaves flavored old-time sauces.

We turn to *Artemisia*—southernwood and wormwood—for pleasant accent plants and foliage background. Growing from two to four feet in height, wormwood produces flower clusters from July to October, which consist of many little drooping yellow heads.

Of southernwood nurserymen say there are three varieties worth growing in this country. First, they mention *A. abrotanum,* a dwarf plant with silvery gray, highly aromatic foliage, and yellow flowers that appear in July. This variety is good for the margins of the border. Long ago it was thought that if a girl put a cutting of it under her pillow at night, the first man she met in the morning would become her husband.

Then there is *A. lactiflora,* a tall-growing plant of fine foliage, bearing heads of small, white flowers in August and September. The lacy effect of its graceful sprays of white bloom endears it to the gardener for cutting purposes. Nurserymen deem it one of the most useful tall plants we have, as it grows about four feet high, thus making an ideal foliage background for phlox and summer lilies.

Early summer sees the third—Silver King—in bloom. Attaining a height of three feet, this striking white-leaved contrast plant, with its bright frosted silver appearance, is ideal for setting off a bunch of cut flowers. Its silvery foliage gives an effect of lightness among the dark green foliage of the other plants.

And finally, as Shakespeare has Perdita say: "There's rosemary and rue; These keep seeming and savour all the winter long." Rosemary—excellent for a hedge—was used

to make wine and perfume and could foretell the future.

Herbs, with only a few exceptions, are easy to grow. Just give them a sunny, well-drained location and they will prosper. Prepare the soil for them by digging it two feet deep, and have it well pulverized. Manure is unnecessary.

Plant the seeds of your annual herbs in the open ground in May, in rows twelve inches apart. Cover them lightly and, when they are large enough, thin them out to eight to ten inches apart in the row.

Although perennials can be raised in the open ground too, it is preferable to start them in a cold frame in February or March, transplanting them to their permanent home in May, if you wish them to attain their full size and to have satisfactory bloom during the first summer.

If you have succumbed so completely to the lure of herb gardening that you must have some herbs for household use, see that you cut them on a dry day just before they come into full bloom, and hang them with their tops down where there is a circulation of air and some sun, so that they may dry quickly. Herbs lose their flavor and fragrance when dried at a high temperature.

The amusing advice of the old herbalists has been included here in the hope that when you plant your herb garden you will enjoy it the more by having some insight into the fascinating past of these little garden plants.

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SPIDER ATTACKS FAIRY PUPPET

BY GEORGE ELWOOD JENKS

NO, THESE are not scenes from some weird nightmare. They are actual snapshots of an unexpected happening, such as might not be caught by a camera once in a life-time.

A Los Angeles photographer was shooting some "stills" for a prospective fairy movie. His actors were tiny cut-out photographs less than an inch and a half tall. They had been carefully posed in a delicate web, the private property of a common spider, and the camera was all set to shoot the fairy dancer.

Suddenly the spider popped out of its den and stood glaring at the strange intruder. "Fine!" thought the photographer, "an added touch of realism for my picture." The shutter clicked and

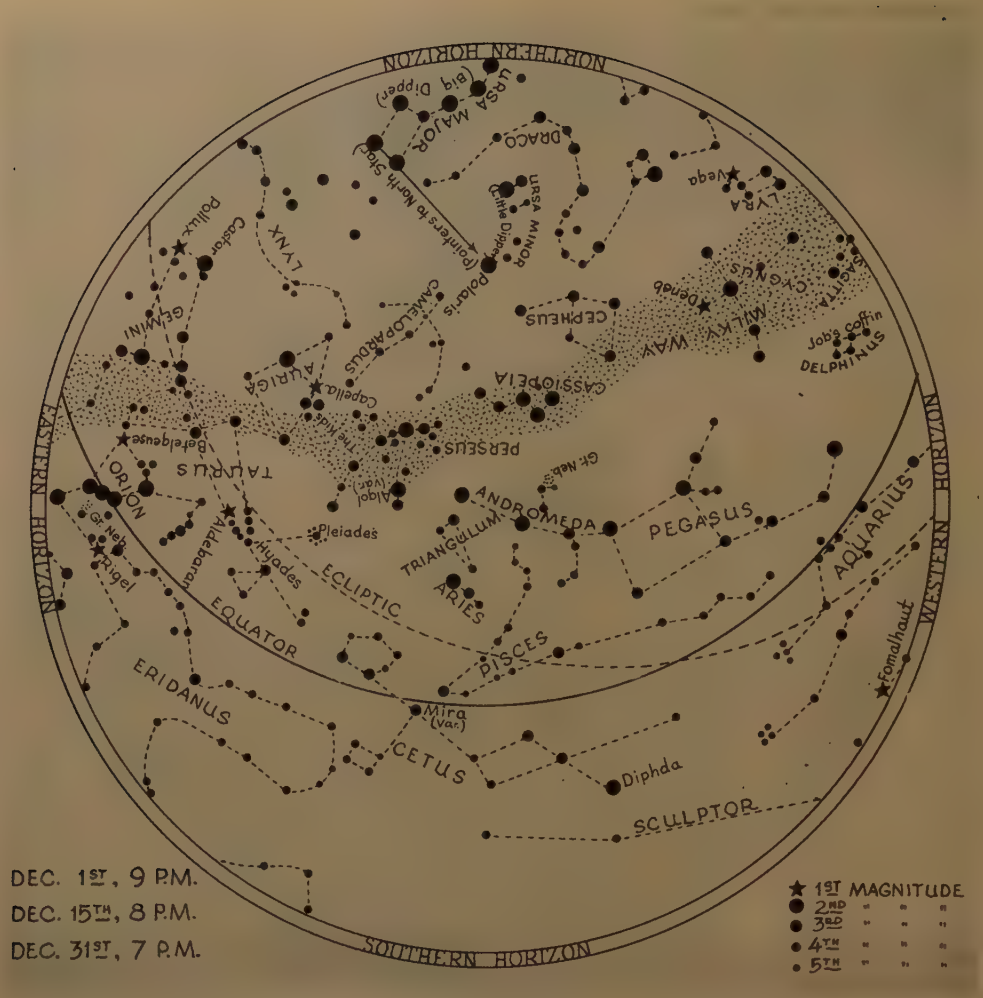
THE CAMERA RECORDS A RARE SCENE IN SPIDER FAIRYLAND

Above, the spider investigates the intruders in his web and below, he gathers courage to leap upon the little cardboard fairy and drag it to his den

the spider scuttled back into its hole.

But the photographer had a hunch. Quickly he prepared for another shot. Out popped the spider again. Once more it crouched and glared, puzzled and uncertain. Was this a new kind of insect? Would it be tender and juicy? The photographer held his breath and waited. Then a flashing leap. For a brief instant the spider held the cardboard fairy in a ferocious clutch. Was it trying to sink its fangs into the tough "insect"? Strangely enough, it had circled and leaped upon the back of the pictured fairy.

Again the shutter clicked. The spider dropped its intended prey and fled. But the ready camera had recorded the rare scene.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

ASTRONOMY FOR THE AMATEUR

BY ISABEL M. LEWIS

DISCOVERIES in the field of astronomy are not made only by professionals. The man whose hobby is astronomy, who knows the stars and constellations and who has, perhaps, a small telescope or good binoculars may surprise himself and the world some day by making a real astronomical discovery. It has been done. Some of the most noted astronomers started their scientific careers in a modest way as amateurs. The more interested one is in astronomy, as a hobby, and the more time he devotes to getting acquainted with the heavens through actual observation and study of the stars and celestial phenomena, the better the chances that he may find something new in the heavens. It might be a comet, or a nova, or a marking on the surface of a planet such as the conspicuous white spot on Saturn which, quick as the professional astronomers were to note it, was first discovered by an amateur astronomer in Germany. Even if one never does make a truly original discovery one will at least have the fun of extending his horizon to the stars and finding out something about other worlds than ours.

For the amateur who wishes to devote a small portion of his time to some one branch of astronomy there is the systematic observation of meteors or of variable stars to consider. The American Meteor Society and the American Association of Variable Star Observers welcome amateur astronomers to their ranks. In fact, the study of variable stars has become one of the best organized and most fruitful fields of amateur research. The professional astronomer has entrusted this large and important field of variable star observation to organized societies of amateur observers because the field is so large and requires such constant surveillance that he cannot profitably handle it alone. Within reach of the naked eye there are one hundred stars in the northern hemisphere that undergo periodic or irregular fluctuations of light, and binoculars or small telescopes greatly increase the number visible. There are also organized societies for the ob-

servation of such stars in England and France. Mr. Leon Campbell, at the Harvard Observatory, Cambridge, Massachusetts, is president of the Association. Dr. C. P. Olivier, Director of the Flower Observatory at Darby, Pennsylvania, is the president of the American Meteor Society; amateur observers may become members and obtain information as to the best way to make and report observations of meteors. The chief essential in both of these fields is familiarity with the constellations and their brightest stars. This is not difficult to attain.

Another interesting field for the amateur is the study of the surfaces of the planets or the moon. For this one needs access to a telescope of small or moderate size, either a refractor, or one of the reflectors, which one may make for himself at home if he has the mechanical ability and the necessary skill and patience. There is much literature in our public libraries on the subject of making telescopes of the reflector type. Some fine telescopes have been made by amateur astronomers.

Comets and novas are apt to appear at any time, and, again, one needs familiarity with the stars to search for them and to recognize them when found. Here too the records show that the amateur has often made discoveries ahead of or at the same time as the professional. When the brilliant nova known by the name of Nova Aquilae No. 3, because it was the third nova to be found in that constellation, flashed forth with startling suddenness in June, 1918, and quickly rivalled the brightest stars in splendor, a flood of telephone calls and telegrams was received at the Harvard College Observatory. These showed how thoroughly the amateur as well as the professional astronomer was on the job.

When Astronomer John E. Willis at the United States Naval Observatory observed a large white spot in the equatorial regions of the planet Saturn, while observing a transit of that planet shortly after midnight on the fifth of last August, he believed he had made an original discovery. But an amateur astronomer in Germany and both amateur and professional astronomers in England had made the same discovery a day or more earlier. It is not remarkable that amateur astronomers should be among the first to observe changes on the surfaces of either of the planets Jupiter and Saturn as these are the most popular planets for observers with small telescopes and are more frequently observed than any others. The appearance of spots on Saturn is rare, but not so in the case of the planet Jupiter. They are, undoubtedly, atmospheric phenomena on both planets. The most noted of such spots, and the most mysterious in origin, is the Great Red Spot of Jupiter which is of a semi-permanent nature and, in fact, old drawings of the planet show that it was observed at least as early as 1831. It was first definitely discovered in 1878 and was then a brick-red color and about 30,000 miles long and 7000 miles wide. It gradually faded out to a pale pink and at times became almost white, with occasional returns, however, to its deeper reddish tinge. Even when scarcely any color is observable the place where it appeared remains notched out of the south equatorial belt of Jupiter. The fact that its period of rotation has changed shows that it drifts in the atmosphere of the planet and is not a part of the solid nucleus.

Such phenomena of fascinating interest may be kept under observation by amateur observers. If careful drawings and records of what they observe are kept they may be of real value. There are many spots, cloud-like in nature, constantly appearing in the atmosphere of Jupiter, and there is an infinite variety of detail and various forms of atmospheric vapors, red, brown and sometimes green in color, that make this planet a never-failing source of interest to the observer. Most of the markings are arranged in belts parallel to the planet's equator but varying in number, width and position. There is a great equatorial current from 10,000 to 15,000 miles wide with a rotation period of about nine hours and fifty minutes. Outside this belt the periods of rotation of different markings are five or six minutes longer and well-defined spots pass one another with more than hurricane velocity of 200 miles per hour. There appear to be well-marked zones on the planet, each with its own period of rotation. It is by noting the time required for spots or other markings to be carried across the visible disk that the planet's period of rotation on its axis is determined. So all observations of well-defined spots on the surface are valuable for this purpose.

Spots on Saturn are observed much less frequently than on Jupiter, and its belts are less distinct and less clearly defined. Its greater distance from the earth also makes its surface markings less easily observable. A white spot appeared near the equator of Saturn in 1876 and was first seen by Professor Asaph Hall, Sr., of the Naval Observatory. It remained visible for several weeks and gave a rotation period for Saturn of ten hours, fourteen minutes, twenty-four seconds. A second spot discovered by Barnard in 1903 in latitude 36 degrees north gave a period about twenty-four minutes longer and showed that the planet, like Jupiter, rotates at different rates in different latitudes. The white spot discovered last August was in the equatorial regions and at the time of its discovery was less than ten thousand miles long and several thousand miles wide. It soon increased in length and spread out along the equatorial zone and became much less clearly defined than when it was discovered. A rotation period of ten hours and seventeen minutes for the planet was determined from it, about three minutes longer than that found from the Hall spot. The cause of the disturbances that give rise to these spots is not clearly understood but is generally believed to be due to some internal eruption from the nucleus of the planet or lowest gaseous levels that eject great gaseous clouds into the upper layers of the planet's atmosphere where they are gradually spread out and dissipated.

Whether or not one has access to a small telescope there is always something in the starry heavens at night to interest the seeing eye. The periodic wink of Algol, The Demon Star; the irregular fluctuation in the brightness of Betelgeuse in Orion; the surprising number of

double stars and clusters that even binoculars will bring into view as we sweep through Orion and the Hyades; the beauties of the Pleiades and the Great Nebula in the Sword Handle of Orion; the chance meteor that darts across the heavens, and that possibly we identify as belonging to a swarm known to us; the splendor of Venus in the west—all are appreciated by one who knows stars.

Venus is now at her best in the western sky in the early evening, reaching greatest brilliancy on December 31. It then sets about three hours after the sun. It is by far the most conspicuous and beautiful object in the western sky and may be easily seen even before the sun is below the horizon if one knows where to look for it. Venus always far outshines any other planet or star, even when *least* brilliant.

Saturn is still visible in the evening sky and at sunset on December 15 may be seen in Capricornus, about one-third the distance from horizon to zenith above the southern horizon. It is a pale yellow in color and equal to a first magnitude star in brightness. It is still a fine object for telescopic observation in the early evening. Jupiter is a fine morning star and on the fifteenth is near the meridian at sunrise, and worth getting up to see.

Mars is now getting too close to the sun to be seen. At sunset on December 15 it is only fifteen degrees above the southwestern horizon.

Mercury is in the morning sky all of the month and on December 6 reaches its greatest elongation west of the sun. It may be found low in the southeast at sunrise for a few days about that time. On December 22, at 1:58 A.M., Eastern Time, the sun reaches its greatest distance south of the equator and winter begins in the northern hemisphere.

In the eastern heavens this month the brilliant constellations of winter are now well in view, including Taurus with its Hyades and Pleiades, and ruddy Aldebaran, Auriga with its beautiful golden Capella, the magnificent Orion, with the Dog-stars following close behind, and over in the northeast Castor and Pollux, in Gemini. Perseus is now high overhead in the Milky Way and directly to the west of Perseus we find Andromeda and Pegasus below Cassiopeia and Cepheus, the Royal Pair who also lie in the Milky Way, which now arches high across the heavens from east to west and adds to the splendors of the early evening skies of winter, which are the most brilliant of all the year.

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A PITIFUL VICTIM

BY ADA CLAPHAM COVAN

THE MANY balmy spells during last winter seemed to preclude any great amount of diminution in the ranks of our feathered friends that gathered round the festive board. But the tragedies still went on.

Unusually large flocks of handsome juncos visited us from early fall. I fell in love with one little female, so fluffed up she seemed fat as a butter-ball, and wearing a lovely dress of soft brown. She was always in a hurry to get somewhere —the seeds just beyond her seemed ever the best.

At first I was amused by her bustling hither and yon, although it seemed strange she so seldom flew with the others. That should have warned me that something was wrong—a solitary junco is unnatural. And she of the little hurrying feet was often alone. For three days I watched her, searching, ever searching, and the steps were growing slower and more uncertain. Then I saw her stagger; saw that the dainty head could turn but one way; noticed the dimness of one eye; watched her as she dug her bill into the dirt in her frantic efforts to scoop up a seed, only to drop it from a powerless bill. Heartsick, I ran seeds through the grinder and watched her ravenous efforts to swallow the tiny bits.

Something had pierced through the bill at its base and, again, just back of one eye. My pretty brown bird was in the frenzy of slow starvation. She was dying in constant sight of the food she craved, and finding it, could not swallow. The damage was too great. That was the pitiful secret of the little hurrying feet.

So many times, the only thing that we can do for such a suffering little creature is to give it everlasting sleep. I can think with a measure of peace of the fast growing flock now resting so quietly at the foot of the big pine tree. Our birds have saddened us as well as gladdened us. Perhaps that is why we hold them so dear. For pity is akin to love.

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

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READING FROM LEFT TO RIGHT WE FIND PONKY AND RED TIGER, TWO KITTENS WHO SPENT A SUMMER IN CAMP AND GOT ALONG WELL TOGETHER, MOST OF THE TIME

A PAIR OF KITTENS

BY ROBERT G. CLOUGH

He was an orphan. No one knew what had become of his mother. He had a nice disposition and was pretty. So the campers at Camp Ponkapoag adopted him. They called him Ponky. You can guess why.

In the picture Ponky is meeting Red Tiger for the first time. Ponky is quite willing to be friends. Red is not so sure that he wants to be friendly. This black-and-white kitten is a new kind to him. Red does not know whether or not to hit Ponky on the nose and run.

After a while the two became good friends. Ponky became a nice pet. He did not like being petted very much, and he was not as affectionate as Red, but he was a good camper. He followed the Camp Master everywhere he went on his daily tasks. He got to be a pest doing this but we could not teach him to stay put.

Finally the camp season ended. Then Ponky disappeared. He left without any warning. We think that he heard the call of the wild and that that call told him he had a nice and easy summer in camp, and that it was time to become a real skunk and make his own living. We hope he is doing well.

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KIYI, A COYOTE

BY IMOGENE HUMPHREY

Why was Father sneaking around to the back door? I waited, puzzled. Then I heard his whistle. Something was up. I opened the back door. Four wistful eyes looked up at me. Two belonged to a man; two to a dog. Or was it a dog?

"What is that?" I asked.

"Please let me keep her," said Father. Both of them looked pleadingly.

"Well," I hesitated, "well . . . all right. But is it a dog?"

"Yes," said Father. "That is, it's part coyote."

So Father came in and told me the story. Some time before some wood cutters had found a baby coyote. They took her to a state institution they were working on and raised her. There she met a collie dog and, still later, some babies came along. One was just like her wild mother. This was the owner of the second pair of wistful eyes. Her name was Kiyi.

We became good friends quickly. She had not met any women before but we understood each other. I knew I had to prove I was her friend but her eyes baffled me. They were yellowish-brown. I saw every emotion in them at different times. There were laughter, thought, craft, cruelty, treachery, tenderness. Always there was a glint of wildness.

KIYI

We had a large yard, so we stretched a long wire and gave Kiyi a long chain. She rolled in the grass and had a happy time. Her coat grew beautiful. We gradually became firm friends. When I came to pet her I was always careful. I never put my hands on her quickly. In fact, she did not like me to touch her with my left hand. My right was the one with which I fed her. In that she had confidence.

When the noon whistles blew Kiyi howled. It was a wild howl, full of strange loneliness. It had shivers in it. Some people liked it. Others did not.

We had two hens in a small pen. One was old and scrawny, the other a fat pullet. The pullet had twice flown over the fence but I had not clipped her wings. One day I noticed Kiyi did not eat her dinner. She lay down beside the dish. There was a peculiar look in her eyes. I thought she was ill. Not so. I watched her. She watched me. For a long time she did not make a move. Then, when my back was turned, she took a small bit of food and went toward the chicken pen. Then she put another bit of food a short distance from the first. Finally she laid a trail of food up to her box where the chain was fastened. Then she laid down to wait.

Over the fence came the pullet. She clucked along from one bit of food to the next bit. When she was within leaping distance Kiyi leaped. Thus ended a chicken dinner. Later Kiyi tricked the old hen and we gave up poultry for a while.

The first year Kiyi was with us went nicely. With the second year there came a change. She was restless or lay sullenly on the ground. No one could touch her but I. She snapped at others and chewed on her chain. We wondered. Should we take her to the mountains and turn her loose? Would she be able to make her own way if we did? She got away twice but never ran entirely away. She did not seem to know whether she really wanted to escape or not and finally allowed me to catch her each time.

Then, one morning, Kiyi was gone. Her collar was chewed. Some time in the night the moon had called her to the wild. The coyote in her had won.

A STORY OF SEA TURTLES

BY SARAH B. HOLMES

ONE evening this summer some friends of ours came to look for turtles. Daddy and my sister Jeanie and I took them to find one. The tide was low so Daddy drove the car on the beach. We drove up the beach for about two miles and a half and saw a turtle crawling up the beach. We turned the car up the hill and put out the lights. If you annoy her in any way before she starts laying she will go back to the water. After she starts laying you can sit on her back, or talk, or shine the light and she won't stop laying. The turtle came up above high-water mark and started digging her nest. She started with her right rear flipper, then twisted to her left side and scooped out the sand, changing from one side to the other. She did this until she had dug a little well about a foot or more deep.

Then she settled down on her nest and began

laying. She would drop two eggs at a time and then sometimes three and sometimes one until she had laid a hundred and twenty-five. The eggs are round, soft and white. After she had finished laying she covered the eggs with sand, using her flippers, and patted it down with her body. Then she left it to go back to the ocean, so we got on her back and rode down to the water.

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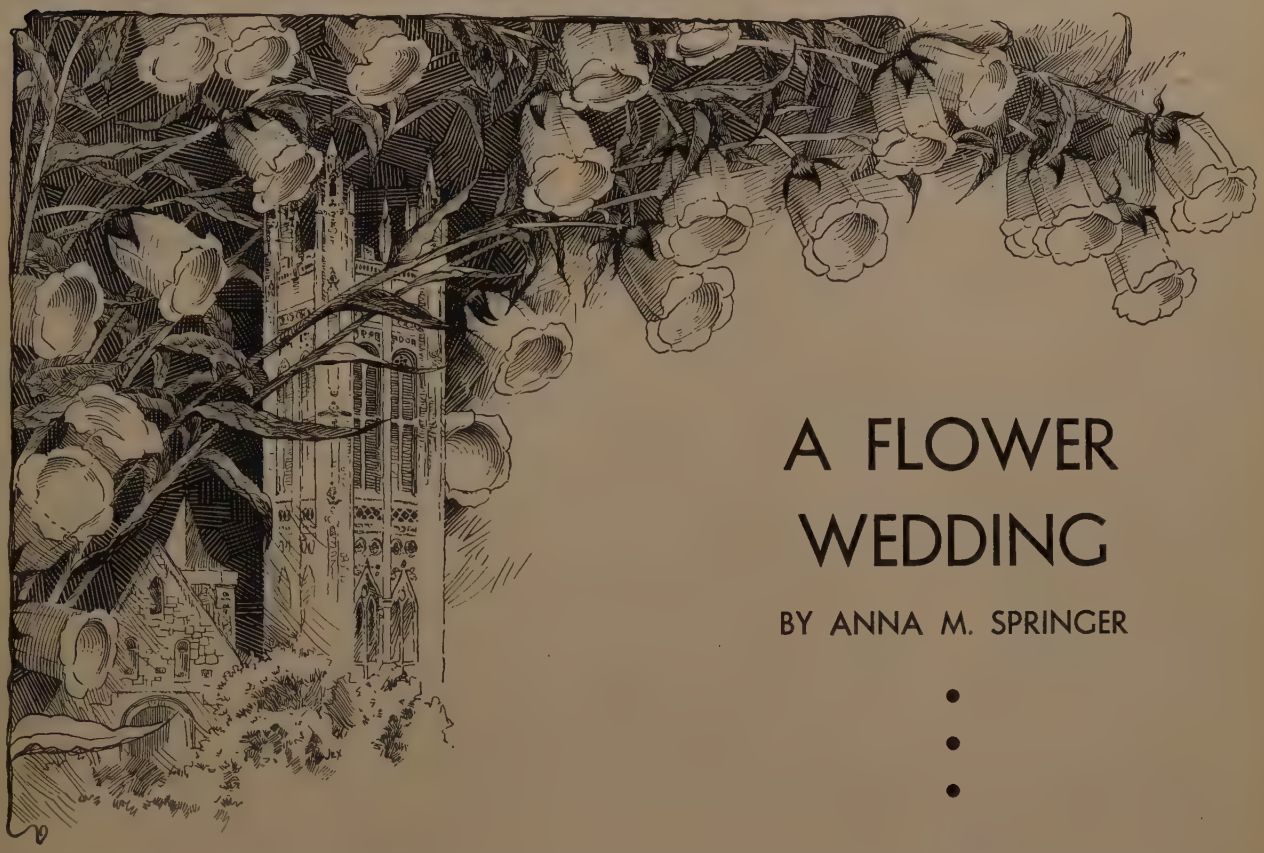

A FLOWER WEDDING

BY ANNA M. SPRINGER

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It was Four-o'clock and the Canterbury Bells were ringing. Phlox of flowers had wended their way to the Star-of-Bethlehem Chapel to attend the wedding of John Quil and Mary Gold. The marriage ceremony was performed by Cardinal Flower assisted by Jack-in-the-Pulpit. The bride was led to the altar by her Poppy. Her sisters, Lily and Rose, were the bridesmaids and Sweet William was best man. The ushers were Dan-de-Lion and Ole Ander. The bride was beautifully dressed in Queen Anne's Lace over silver leaf Geranium. She wore a Bridal-wreath of Orange Blossoms and carried a shower bouquet of Lilies-of-the-Valley.

After the service, the wedding party adjourned to the terrace, where a Snow Ball and brilliant Hop had been planned. They were led by Trumpet Vine who later kept Thyme for the Mignonette dance. Rose Peony, Polly Anthus, Black-eyed Susan, and her sister, Daisy, were in charge of arrangements.

Lady Aster was the guest of honor. She was very pleasing in her dress of Sage green, adorned with delicate Mountain Fringe. Sun-flowers with their Golden Glow lightened the shadows under the Tulip trees and brought to view a beautiful statue of the Maid-in-the-Mist. Bluebell lanterns hanging from the trees threw out Violet rays.

Among those present were the Reverend Father Zinnia who walked about wearing his Monk's Hood and carrying a Golden Rod; General Hy Drangea with his two lovely daughters, Jessamine and Myrtle; Colonel R. Butus, in gay military dress, still wearing his Lark-spurs and Sword Fern; Captain Narcissus, a member of the Cosmos Club, accompanied by Miss Primrose; Madame Chrysanthemum and her friend, Mrs. Wisteria, from Japan; and several others of distinction. Petunia and Fuchsia Stem were there with a number of this season's Buds, fluttering among the crowds, all as pretty as Peach Blossoms and as bright as the Morning Glory.

Before the bride and groom drove away, they bade Good-bye to Mother-Wort and sang "Forget-me-not." Some young Sprouts threw Lady's Slippers after them with all good wishes. A little later, Night-Shade and Moon Flower came out to take formal Leave of the wedding guests.

THINGS TO THINK ABOUT

A PAGE DEVOTED TO CONSERVATION FROM VARYING ANGLES

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Bogle and Bobwhite

For some years one M. E. Bogle has operated a profitable business in furnishing live quail to State game authorities and private individuals to stock covers depleted by overshooting. An elaborate catalog told how these birds were raised. His alleged success in raising the birds caused suspicion in some quarters, but most of his customers seemed to care little as to the source of the birds they bought, and raised no questions. Finally, however, it was disclosed that he raised few or no birds, but merely shipped, at a handsome profit, birds that were trapped under his direction by country boys and others. On one occasion, several years ago, a large consignment of birds, already crated for shipment and known to be his, was found in a warehouse in Memphis, Tennessee, but Bogle and his accomplices escaped to Texas. Though under indictment, and using every device known to the devious practice of the law to escape punishment, Bogle has continued to operate his quail-distributing business from headquarters in San Antonio. In spite of the wave of publicity that accompanied his original indictment, for some of the agencies that had blithely helped on his schemes were so horrified at the disclosures that they almost fell over backwards in their indignation, some sporting periodicals continued to carry his advertisements, and it is presumed that he continued to fill orders. It would be interesting to learn the names of some of the customers who continued to contribute to the success of a business known to be fraudulent and destructive, but such things are not told. Unpleasant publicity about persons in high places is not popular.

Finally, however, Bogle was convicted of transporting live quail from one state to another contrary to the Migratory Bird Treaty Act. He was fined $1,800 and sentenced to serve eighteen months in jail. By paying the fine, however, he escaped jail. He had made many thousands of dollars in his nefarious operations, and could well afford to pay a fine. But to force him to spend a year and a half unprofitably in jail was unthinkable, for manifestly he had not accumulated any extra time. Some such philosophy may have been behind the decision to accept from a person unfortunate enough to be convicted of a serious offence that which he could best afford to pay.

We await with interest any further evidence bearing on this case, and wonder in what guise we shall next hear of Bogle.

Crippling of Waterfowl

We note an appeal to hunters, issued by the Biological Survey, to avoid the crippling of so many waterfowl. It has long been known that great numbers are wasted in this way, and here and there one may find published reference to the fact, though usually the matter is treated as something that is unavoidable. The release, referred to, however, puts the subject in a clearer light than usual. The annual waterfowl bag is estimated at 15,000,000 birds, and it is calculated that one out of every three birds is crippled and lost. As these are not counted in the bag of the average gunner, this means 7,500,000 birds lost and wasted each season. Surely our depleted stocks of waterfowl cannot be expected to stand such a waste.

There are several reasons why many waterfowl are wounded. Even under the best of conditions a certain proportion are so lost, as any hunter knows. But we believe that the situation has been growing worse. We believe that the gunners, with lessened experience, are now less skillful, on the average, than the old-time hunters, and that many who shoot have too little knowledge of the effective range of their weapons. The ammunition dealers are in part responsible, for they advertise certain loads that are supposed to kill at extreme ranges. Also, unfortunately, many are indifferent in the matter. A quotation from an article "Hunters' Luck", in one of the more conservative of the publications boosting recreation and highway interests in a southwestern state, will illustrate this point:

"Taking all chances we figured five shots to a duck, sometimes more, sometimes less—often more. It depends a good deal on the breaks. It has happened to me that I fired twenty-three shots and the best I could do was to cripple a few, or slow them up and get them later. . . . Of course, if a man was to pick his shots, that is a different story, but then he might get two or three in a day. There is little sport concerned with that type of hunting."

Well, if this represents the views of any considerable proportion of the duck gunners, an appeal to their sportsmanship will be futile. But we would point out that a bag of two or three ducks, repeated for only a few days, represents all the ducks that any gunner is entitled to kill in a season, even if 15,000,000 are bagged, for somewhere about 2,000,000 people are doing the killing. And the supply will not long bear this drain. Unless forbearance is generally practiced hunting will be stopped, for extermination will not be tolerated.

NIRA, Chattanooga's Eagle

With an abundance of attendant publicity an American or bald eagle, the symbol of our country, was released recently from the dome of a prominent building in Chattanooga, Tennessee, charged with the duty of helping to forward national industrial recovery and better times. May his mission be successful.

For more than a hundred and fifty years, the American eagle has been our national symbol. An eagle, presumably representing our own species, is the symbol of the National Industrial Recovery Act. Thus the liberation of this particular individual is heralded widely.

In an extended account of the impending event a local paper represents the bird as "protected by state and federal laws against shooting". This statement, unfortunately, is not entirely true. The Congress has failed on several occasions to enact a protective law, and though several of the states do protect the bird nominally, such laws are seldom enforced. At least one eastern state has recently withdrawn protection, and a mid-western state has actually offered a bounty for destruction of eagles. Many thousands of the birds have been killed in Alaska during the past several years by virtue of a bounty law that paid a dollar (some years only a half-dollar) on proof of the death of an American eagle.

Probably a majority of our people naturally assume that our country extends protection to the bird. So while we are celebrating the liberation of this particular individual eagle let us not forget the thousands that have been killed for a dollar or less, or merely because of propaganda that the species is in part responsible for the decrease in our game supply. And let us work for the protection of the bird whose image stands for our own liberty.

The Conservation Crisis

We have before us a pamphlet issued under this title by Harry B. Hawes, being an address delivered at the 27th Annual Convention of the International Association of Game, Fish and Conservation Commissioners at Columbus, Ohio, September 21 and 22, 1933. The author makes one statement with which we are in entire agreement when he says: "There is a shortage of ducks. There is indeed a shortage of game of all kinds, and for that matter, a serious shortage of game fish. Nobody disputes this fact. It is not necessary to prove this statement; it is admitted."

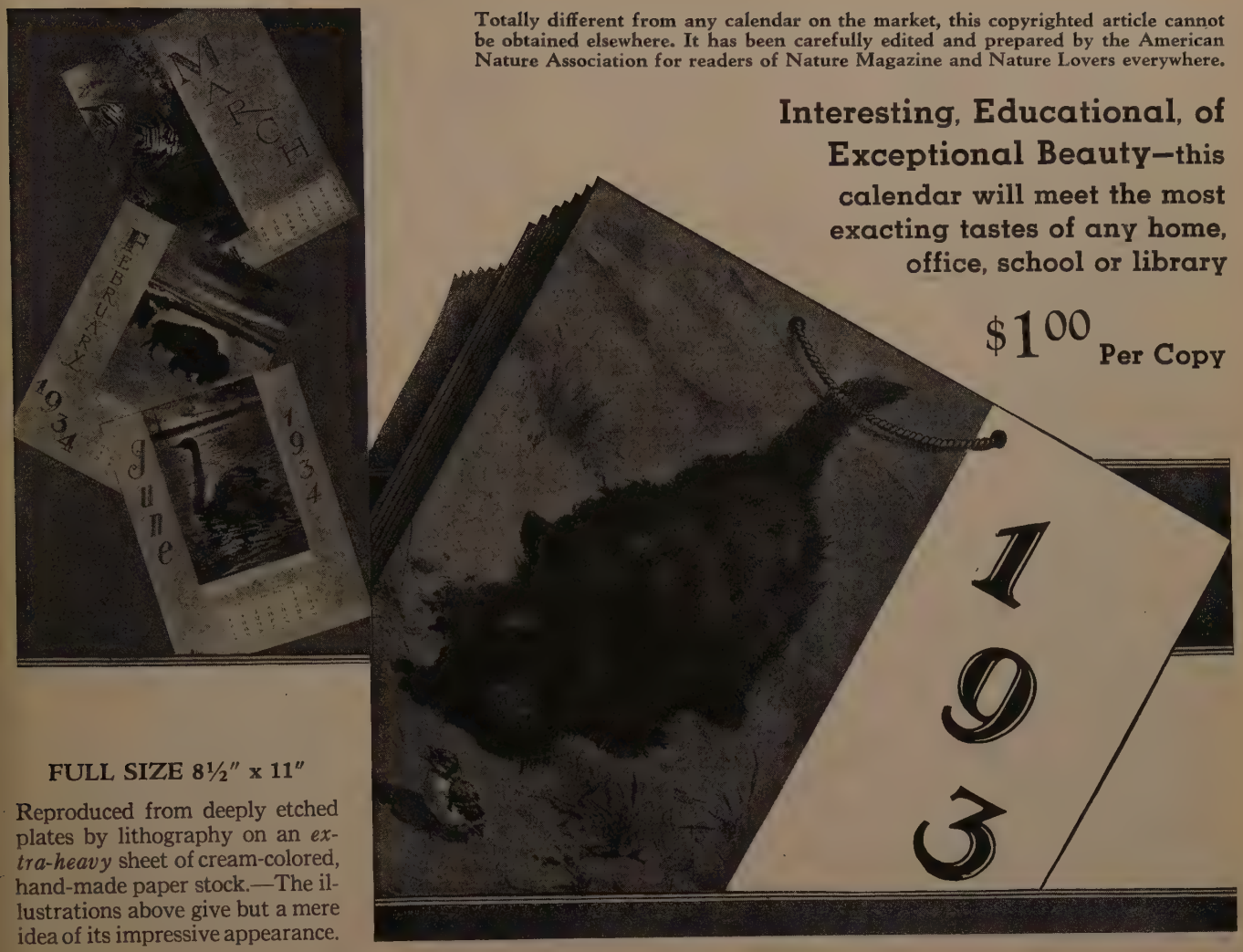
The remedy proposed for the crisis referred to is the passage of bills in the House and Senate providing for a "Duck Stamp", to be affixed to the license of each waterfowl shooter, the proceeds "to restore conservation in a practical way throughout the nation."

The idea that so desirable a condition can be effected by such a simple method is so fantastic that it deserves no comment. What makes the pamphlet notable is the pains taken by the author to deride and insult a class that he characterizes as unsportsmanlike meddlers, sentimentalists, theorists, sobsquads and what-not. This class seems to include all those who do not kill game, yet who are interested in the perpetuation of the species involved. They are said to be more dangerous than market hunters and game sellers. No credit is given for the substantial part they have played in the passage of remedial legislation. Of course the killers are lauded as the only friends and preservers of the waterfowl. If these birds *had been preserved*, we would be more ready to accord these *"friends"* the honor their champion claims. But since under their ministrations there has resulted a *"shortage of game of all kinds"*, the implication that this shortage is chargeable mainly to those who do not kill the birds is ridiculous. But it is only one of the many absurd features of a production that might be dismissed as harmless did it not come from a former member of the Senate Wild Life Conservation Committee whose utterances will be taken seriously by many thoughtless exploiters of our wild life.

We advise that Mr. Hawes' speech be widely read and deeply pondered.

SOMETHING NEW IN CALENDARS

A NATURE GUIDE THROUGH 1934



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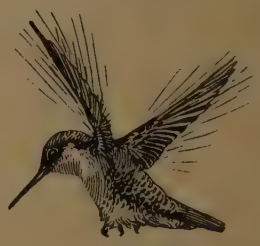

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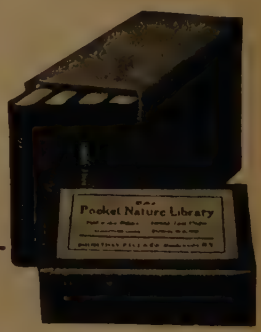

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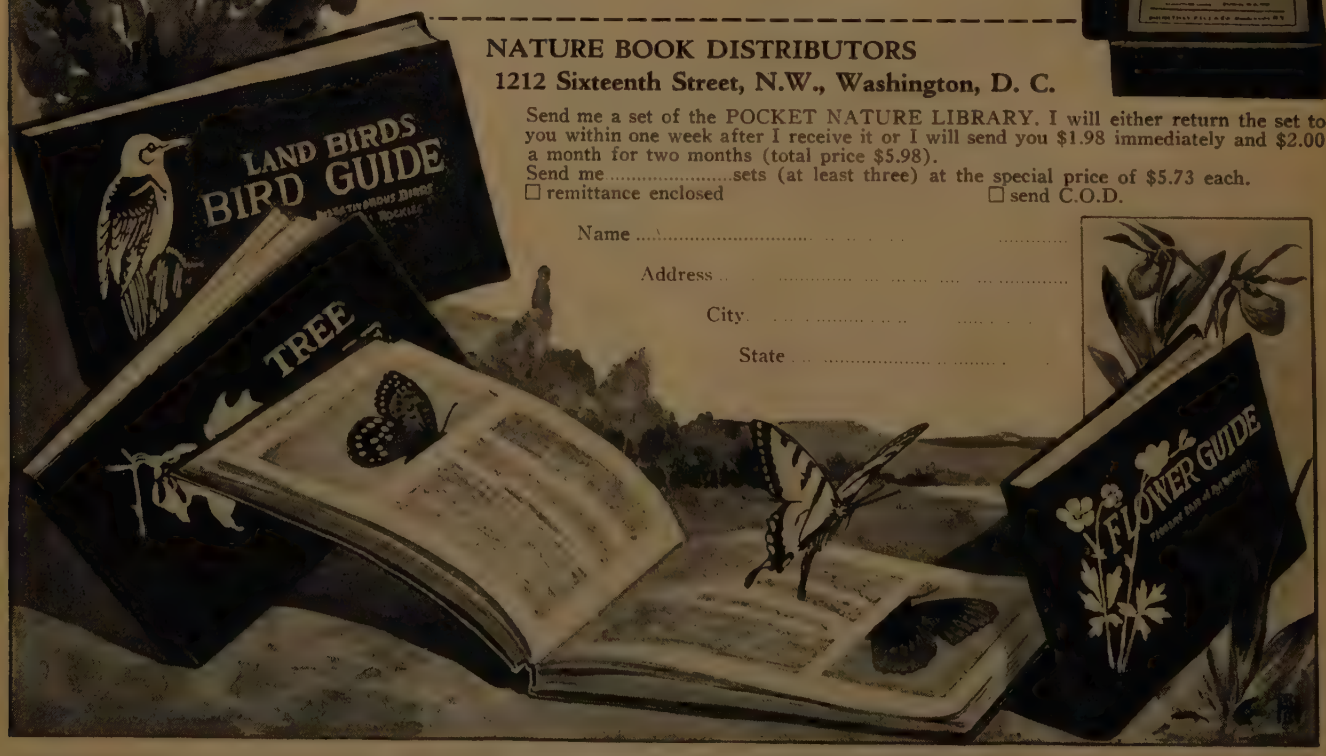

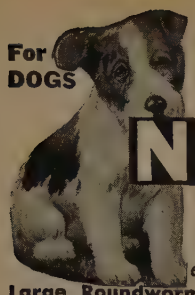

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GARDENS AND GARDENING

Edited by
ROMAINE B. WARE

Some months ago I chanced upon an interesting garden whose owner, though a busy man and much away from home, had taken time to enjoy the trees on his estate. Proudly he showed me his treasures. Truly every one was a valued friend. He knew them intimately and loved them well. Not only were his acres rich in native species but through the years many exotic specimens from distant lands had been added. He does not aspire that his estate be an arboretum but almost unintentionally it has become a valuable collection.

Not all of us have acres at our disposal where we can garden with trees but we can gather other kinds of plant material. We can study them, learn their habits and needs. Even the small yard has room for a specialized garden of some kind. I knew of a city lot garden in Minneapolis which contained more than two hundred varieties of peonies and as many choice iris.

In gardening, the collector's field is unlimited. Take the great family of campanulas; one seed house lists over one hundred thirty kinds, and more than that many primulas. Here alone are two vast fields for experiment. The many kinds will vary greatly in their cultural demands and one of the greatest joys of gardening lies in finding ways to succeed with out-of-the-ordinary plants.

Some enthusiasts vent their collecting instincts upon rock garden plants and this is a vast field, seldom adequately explored. A long lifetime may be spent following this engrossing hobby with no fear of exhausting its possibilities. Out in Portland, Oregon, that paradise of rock gardening, I met a rock garden enthusiast who devoted all her spare time to experimenting with unusual and almost unknown varieties. She has correspondents all over the world who send her seeds. But even though she is virtually an expert, many varieties test her skill to the utmost. It is these unknown, unexplored plant families which add zest to the game.

Other gardeners devote their efforts to perfecting the details of their garden borders. The fascinating pursuit of color combinations and successions is an unending pastime. Those two delightful writers upon garden topics, Louise Beebe Wilder and Mrs. Francis King, have studied and experimented along this line for many years and have written for us records of successes and failures. If you would become better gardeners, read their books and try their recommendations.

The perfect garden border has never yet been developed and its attainment may well become the aim of almost any aspiring gardener. Surely it is a worthwhile task. The probabilities are that your border will never become one hundred per cent satisfying but that is no reason for not trying. Long winter evenings may profitably be devoted to study of combinations and successions for all season bloom. It is one thing to have a wealth of bloom in June or September and quite another to plan each fifty to one hundred square feet of your border so there

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I wonder how many of our readers will include the garden in their Christmas list this year. What could be more fitting than that the garden, which gives us so much pleasure and satisfaction, should be the recipient of a gift at this season? Of course, in a way, it is a selfish gift because it is primarily for our own enjoyment, but such a gift is justified. Why not present the garden with a sun dial or a bird font, a few evergreens or a pergola? Seldom is there a garden so completely furnished that addition cannot be accommodated.

The Christmas season is an excellent opportunity to present garden-minded friends with books upon their hobby.

Garden tools make acceptable gifts also. What true gardener would not appreciate a trowel of the best quality, one of those light, strong ones with a welded steel shank? A high grade pair of pruning shears makes an excellent gift, costing $3 to $5. However, if you want the recipient to be everlastingly indebted to you, buy him one of the new hedge shears. They operate by electricity, trim hedges, shrubs, evergreens and most anything else in one-fourth the time hand shears demand, and better yet, with a tenth of the effort. They are not a cheap tool but once owned are worth many times their cost.

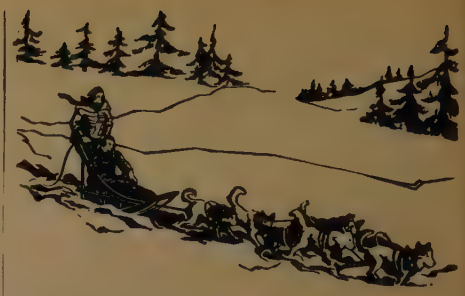
For the lady who enjoys actual dirt gardening but finds it difficult to keep her hands presentable, a pair of the new "Eezy Wear" garden gloves would be a welcome gift. They are all leather, washable and soft as kid. These gloves cost only seventy-five cents and come in sizes for men as well as women. A useful gift of the highest order.

Maybe some of your gardening friends have bewailed the fact that moles play havoc in their gardens. Why not give them one of the new Acme mole traps? Their many users report one hundred per cent control where used consistently. At two dollars they prove an admirable gift.

There are many other garden gadgets which practical gardeners would welcome at Christmas time. If none of those suggested here seems to fit, just write us a note and we will try to find something for your particular need. Let our garden department help you.

Do your garden club activities end with the first frost? If so, let us suggest that you may be missing important opportunities. One of the most successful garden clubs I ever knew began their meetings in the fall and held them monthly till May. As real gardeners they enjoyed talking about their hobbies during the months when outdoor activities were somewhat restricted.

More than five hundred men were members of this club and each month interesting meetings were held with speakers from far and near. They held competitive shows open to the public, and, each April, sponsored a public meeting in the municipal auditorium where several thousand people imbibed garden enthusiasm and were inspired to strive for better gardens. Not all garden clubs can attempt such ambitious undertakings but many can widen their sphere of activity by continuing their meetings through the winter months and building a reserve of garden enthusiasm. After all, garden interest is a year-around matter, if it is to be translated into success.



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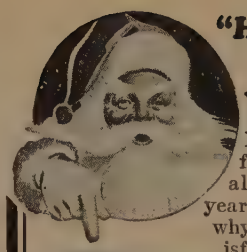
Wild Life Fiction

Eyes of the Wilderness is a collection of short stories by Charles G. D. Roberts, most of them being wild life stories or animal stories in which domestic as well as wild animals play a part. The result is a fascinating book. Mr. Roberts is a charming writer and knows his outdoors. He belongs to the school of wild life writers who hold that, regardless of whether happenings in the wild are probable, if they are possible they are legitimate material for wild life fiction. For example, his first story is about a pedigreed cat which, by the machinations of fate, spends some months in the wild and mates with a bobcat. It is a delightful story but we will give long odds that our heroine, Tabitha Blue, could never have managed such experiences outside the covers of a book. Mr. Roberts would answer that we cannot prove that she would not have survived. And we can't. So we'll call it a draw and admit we liked the story just the same. It seemed to us that the best



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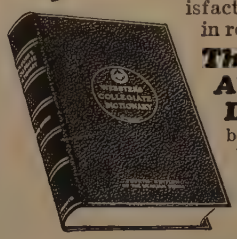

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story in the book was that in which a moose cow and her calf are the central actors in a drama in which a forest fire drives the wild life of the forest before it. It is a poignant bit of writing. The book is published by the Macmillan Company.

New Bird Exhibit

Commemorating the studies together of Lord Grey of Fallodon and Theodore Roosevelt, a new bird habitat group has been unveiled at the American Museum of Natural History in New York. It presents a scene on the English countryside where these two great bird lovers more than a generation ago observed and identified English birds. Some sixty species of birds are represented in the group, which shows a heather-covered and beech-shaded knoll against a background of moor-fringed forest. The exhibit was unveiled by F. Trubee Davison, president of the American Museum.

Fossil Facts

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Whither Is Science Leading?

In a new book *The Universe of Science* the author, Professor H. Levy of the Imperial College of Science of the University of London, has endeavored to sketch in broad outline the background against which present day science is to be seen. There is urged a return to the patient methodical study of the things of Nature, and the resources of the globe, scattered broadcast by Nature's bountiful hand, irrespective of the natural barriers man has established in his past struggle to survive. It is pointed out that science has become so highly specialized that professional philosophers are unable to handle it, and that philosophical scientists must do so. The author presents a vivid individuality and has many a keen comment and pertinent intimation. The book will be of interest to all who try to look through the outward manifestation of Nature to the plan and purpose beyond. It is an octavo volume of 222 pages and is issued by the Century Company, New York, at $2.00 per copy. J. S. W.

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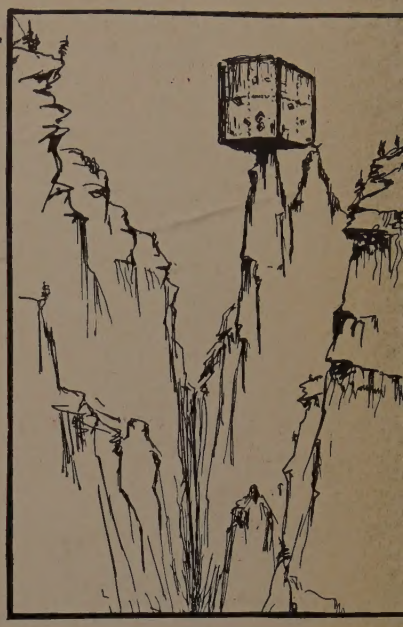

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Finally, in growing awe, we come to realize tha what it now is,— this ancient Mother of us all, thi huge revolving ball of gas and matter,— it will not b tomorrow.

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THE Book-of-the-Month Club knows that there are a great many readers who have intended in the past to join it, and have neglected to do so through pure oversight. This offer is made, frankly, to overcome that procrastination by making it really worthwhile for such persons not to delay longer. We suggest simply that you send the postcard below to get full information as to what the Club does for book-readers, and then decide once for all whether or not you want to join. Are you aware, for instance, *that as a member you are not obliged to take a book every month;* nor are you ever obliged to take the specific book-of-the-month chosen by the judges. You may buy it or not, as you please, after reading the judges' pre-publication report about it. *Nor do you have to pay any fixed sum per year to be a member.* You simply pay the regular retail price for such books as you decide to buy. What then is the advantage of joining?

There are many: first, from the point of view of economy, under the unique book-dividend policy of the Club, for every dollar its members spend on books they received back on the average over 50% in the form of free books. Moreover without a penny of expense through the reports of the judges you are kept com pletely and authoritatively informed about all the im portant new books, so that you can choose among then with discrimination, instead of having to rely upon ad vertising and hearsay. Equally important, the systen really ensures that you will read the particular new books you are anxious not to miss.

There are several other advantages like these, not read ily measurable in money, that cannot be outlined here fo lack of space. Surely, within the next year, the distin guished judges of the Club will choose as the book-of-the month or recommend as alternates, *at least a few book* that you will be very anxious not to miss and which yo will buy anyway. Why not—by joining the Club—mak sure you get these instead of missing them, which so ofte happens; get the really substantial advantages the Clu affords (such as the book-dividends mentioned, if nothin else), and at the same time get a copy of VAN LOON'S GEOGRAPHY, free. Send the postcard below, for mor complete information as to how the Club operates.

One of the 163 drawings Mr. Van Loon himself has made for his book 22 of them in full color.—A good example, this, of Van Loon's metho of picturing the earth not as a simpl surface, but in three dimensions

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